



(11)

EP 3 919 833 A1

(12)

EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:

08.12.2021 Bulletin 2021/49

(51) Int Cl.:

F24F 11/64 ^(2018.01) **F24F 11/61** ^(2018.01)
F24F 11/65 ^(2018.01)

(21) Application number: **19928002.5**

(86) International application number:

PCT/CN2019/129761

(22) Date of filing: **30.12.2019**

(87) International publication number:

WO 2020/224280 (12.11.2020 Gazette 2020/46)

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

Designated Extension States:

BA ME

Designated Validation States:

KH MA MD TN

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(30) Priority: **08.05.2019 CN 201910381165**

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(54) **METHOD AND APPARATUS FOR DETERMINING INDOOR SET TEMPERATURE, STORAGE MEDIUM AND AIR CONDITIONER**

(57) A method and a device for determining a set indoor temperature, a storage medium and an air conditioner, the method includes: determining whether a fluctuation in indoor ambient temperatures within a set duration reaches a set fluctuation threshold; if the fluctuations reach the set fluctuation threshold, then determining the set indoor temperature according to a set self-adaptive mode. The self-adaptive mode includes determining the set indoor temperature based on a balance principle

of a thermal load of a building and quantity of heat production of an air conditioner. A solution of the present application may solve a problem of poor comfort experience that a user feels hot and cold from time to time due to frequent adjustments for the set indoor temperature of the air conditioner according to an outdoor temperature, and achieves an effect of improving the comfort experience of the user.

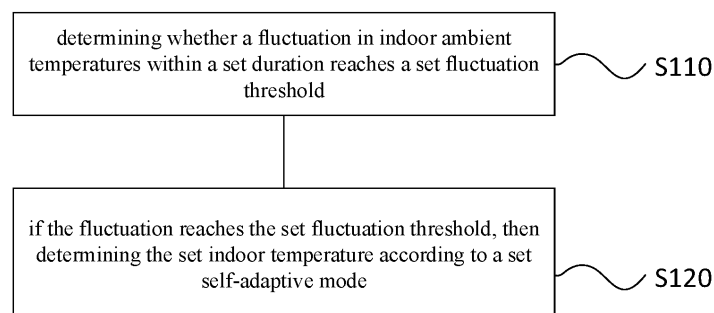


FIG. 1

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Description**CROSS REFERENCE TO RELATED APPLICATION**

[0001] This application claims priority to Chinese Patent Application No. 201910381165.0, filed on May 8, 2019, and entitled "Method and Device for Determining Set indoor temperature, Storage Medium and Air Conditioner", the contents of which is incorporated herein in entirety by reference.

TECHNICAL FIELD

[0002] This application belongs to the technical field of air conditioners, and specifically relates to a method and a device for determining a set indoor temperature, a storage medium and an air conditioner, and in particular, to a method and a device realizing a self-adaptive control strategy of an air conditioner for the set temperature, and a storage medium and an air conditioner.

BACKGROUND

[0003] Taking the heating of an air conditioner as an example, along with the increase of the outdoor temperature, the thermal load of a building decreases, but the quantity of heat production of the air conditioner increases, and a user feels hot. At this time, the user usually lowers a set temperature to reduce the heat. However, the user is not sure about the specific adjustment amount of the set temperature, or not sure about the constant temperature space he needs, but only adjusts the temperature according to the sense of cold and heat, that is, lowers the set temperature when the user feels hot, and increases the set temperature when the user feels cold. Because the set temperature is adjusted to be too low, the user will feel colder, and then the user adjusts the temperature to be higher, which will cause the indoor temperature to fluctuate repeatedly and make the user feel hot and cold from time to time. Therefore, the comfort experience is poor.

[0004] FIG. 10 shows 24-hour monitored data of a heat pump of an example household in Mongolia during a demonstration. It may be seen from FIG. 10 that the outdoor temperature is the lowest from AM 12:00 to AM 6:00, as low as minus 21 degrees Celsius, and the set indoor temperature is 28 degrees Celsius. Since the indoor temperature is relatively high and the outdoor temperature is relatively low at this time, the thermal load of the building is relatively large. After AM 6:00, on the one hand, as the outdoor temperature increases, the thermal load of the building will decrease. On the other hand, the quantity of heat production of the air conditioner will increase, and the user will feel hotter. Therefore, after AM 8:00, when the outdoor temperature continues to increase, the thermal load of the building will continue to decrease at this time. The user will adjust the set temperature from 28 degrees Celsius low to 25 degrees Celsius, but the user is not sure about the adjustment amount of the set temperature, and only adjusts the temperature according to the sense of cold and heat. Because the set temperature is adjusted to be too low, the user feels cold at PM 12:00, and then adjusts the set temperature to be higher. Especially after PM 4:30, the user frequently adjusts the set temperature, which causes the indoor temperature to fluctuate between 21 degrees Celsius and 30 degrees Celsius. The user feels hot and cold from time to time, and the comfort experience is poor.

[0005] The above contents are only used to assist the understanding of the technical solutions of the present application, and but not mean that the above contents are the prior art.

SUMMARY

[0006] In view of the defects above, objectives of the present application are to provide a method and a device for determining a set indoor temperature, and to provide a storage medium and an air conditioner, so as to solve a problem of poor comfort experience that a user feels hot and cold from time to time due to frequent adjustments for the set indoor temperature of the air conditioner according to an outdoor temperature, and to achieve an effect of improving a user's comfort experience.

[0007] This application provides a method for determining the set indoor temperature, including: determining whether a fluctuation in indoor ambient temperatures within a set duration reaches a set fluctuation threshold; if the fluctuation reaches the set fluctuation threshold, then determining the set indoor temperature according to a set self-adaptive mode. The self-adaptive mode includes determining the set indoor temperature based on a balance principle of a thermal load of a building and a quantity of heat production of an air conditioner.

[0008] In an embodiment, the determining whether the fluctuation in indoor ambient temperatures within the set duration reaches the set fluctuation threshold, includes: obtaining two or more indoor ambient temperatures at a set time interval within the set duration; determining whether an absolute value of a difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures is greater than or equal to the set fluctuation threshold;

if there is a set number of absolute values, among absolute values of the difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures, and greater than or equal to the set fluctuation threshold, then determining that the fluctuation in the indoor ambient temperatures within the set duration reaches the set fluctuation threshold.

[0009] In an embodiment, the determining the set indoor temperature according to the set self-adaptive mode, includes: determining a first quantity of heat production of the air conditioner and a first thermal load of the building in an environment where the air conditioner is arranged; determining whether an absolute value of a difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold; if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold, then determining that a first constant temperature of constant temperature space required by a user, which is related to both the first quantity of heat production of the air conditioner and the first thermal load of the building, is the set indoor temperature; if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is greater than the set load threshold, then re-determining a second quantity of heat production of the air conditioner and a second thermal load of the building in the environment where the air conditioner is arranged, and re-determining the set indoor temperature based on an iterative method and according to the re-determined second quantity of heat production of the air conditioner and the re-determined second thermal load of the building in the environment where the air conditioner is arranged.

[0010] In an embodiment, the determining the first quantity of heat production of the air conditioner and the first thermal load of the building in the environment where the air conditioner is arranged, includes: obtaining a temperature of the constant temperature space required by the user to function as the first constant temperature, and obtaining an outdoor ambient temperature and an outlet air temperature of the air conditioner; calculating the thermal load of the building according to the first constant temperature and the outdoor ambient temperature, and calculating the quantity of heat production of the air conditioner according to the first constant temperature and the outlet air temperature of the air conditioner.

[0011] In an embodiment, the re-determining a second quantity of heat production of the air conditioner and a second thermal load of the building in the environment where the air conditioner is arranged, includes: obtaining an assumed temperature of the constant temperature space required by the user to function as a second constant temperature, and obtaining the outdoor ambient temperature and the outlet air temperature of the air conditioner; calculating a second thermal load of the building according to the second constant temperature and the outdoor ambient temperature, and calculating a second quantity of heat production of the air conditioner according to the second constant temperature and the outlet air temperature of the air conditioner. If the first quantity of heat production of the air conditioner is greater than the first thermal load of the building, then the second constant temperature is less than the first constant temperature; and if the first quantity of heat production of the air conditioner is less than the first thermal load of the building, then the second constant temperature is greater than the first constant temperature.

[0012] In an embodiment, the method further includes: determining whether the self-adaptive mode selected by the user has been received after the air conditioner is turned on; if it is determined that the self-adaptive mode selected by the user has been received after the air conditioner is turned on, then directly determining the set indoor temperature according to the set self-adaptive mode; if it is determined that the self-adaptive mode selected by the user is not received after the air conditioner is turned on, then determining whether the set self-adaptive mode is activated according to stored information in a memory mode of the air conditioner. The memory mode includes determining whether the set self-adaptive mode is activated according to a time difference between user's two adjustments for the set indoor temperature and an indoor temperature difference.

[0013] In an embodiment, the determining whether the set self-adaptive mode is activated according to the stored information in the memory mode of the air conditioner includes: determining the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference; determining whether the time difference is less than or equal to a set time threshold, and whether the indoor temperature difference is less than or equal to the set temperature threshold; if the time difference is less than or equal to the set time threshold, and if the indoor temperature difference is less than or equal to the set temperature threshold, then sending a reminder message to remind the user of deciding to select the self-adaptive mode or not, and resetting each set time, each set temperature, and each indoor temperature stored in the memory mode, and entering a new memory mode under a condition that it is determined that the user does not select the self-adaptive mode; if the time difference is greater than the set time threshold, or if the indoor temperature difference is greater than the set temperature threshold, then resetting each set time, each set temperature, and each indoor temperature stored in the memory mode, and entering a new memory mode.

[0014] In an embodiment, the determining the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference, includes: obtaining a first set time when the user adjusts the set indoor temperature for a first time, a first set temperature, and a first indoor temperature after the air conditioner operates stably based on the first set temperature, and obtaining a second set time when the user adjusts the set indoor temperature

for a second time, a second set temperature, and a second indoor temperature after the air conditioner operates stably based on the second set temperature; determining the time difference between the second set time and the first set time, and the indoor temperature difference between the second indoor temperature and the first set temperature.

[0015] Corresponding to the above method, another aspect of the present application provides a device for determining a set indoor temperature, including: a determining unit, configured to determine whether a fluctuation in indoor ambient temperatures within a set duration reaches a set fluctuation threshold; a control unit, configured to determine the set indoor temperature according to a set self-adaptive mode if the fluctuation reaches the set fluctuation threshold. The self-adaptive mode includes determining the set indoor temperature based on a balance principle of a thermal load of a building and a quantity of heat production of an air conditioner.

[0016] In an embodiment, the determining unit determining whether the fluctuation in indoor ambient temperatures within the set duration reaches the set fluctuation threshold, includes: obtaining two or more indoor ambient temperatures at a set time interval within the set duration; determining whether an absolute value of a difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures is greater than or equal to the set fluctuation threshold; if there is a set number of absolute values, among absolute values of the difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures, and greater than or equal to the set fluctuation threshold, then determining that the fluctuation in the indoor ambient temperatures within the set duration reaches the set fluctuation threshold.

[0017] In an embodiment, the control unit determining the set indoor temperature according to the set self-adaptive mode, includes: determining a first quantity of heat production of the air conditioner and a first thermal load of the building in an environment where the air conditioner is arranged; determining whether an absolute value of a difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold; if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold, then determining that a first constant temperature of constant temperature space required by a user, which is related to both the first quantity of heat production of the air conditioner and the first thermal load of the building, is the set indoor temperature; if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is greater than the set load threshold, then re-determining a second quantity of heat production of the air conditioner and a second thermal load of the building in the environment where the air conditioner is arranged, and re-determining the set indoor temperature based on an iterative method and according to the re-determined second quantity of heat production of the air conditioner and the re-determined second thermal load of the building in the environment where the air conditioner is arranged.

[0018] In an embodiment, the control unit determining the first quantity of heat production of the air conditioner and the first thermal load of the building in the environment where the air conditioner is arranged, includes: obtaining a temperature of the constant temperature space required by the user to function as the first constant temperature, and obtaining an outdoor ambient temperature and an outlet air temperature of the air conditioner; calculating the thermal load of the building according to the first constant temperature and the outdoor ambient temperature, and calculating the quantity of heat production of the air conditioner according to the first constant temperature and the outlet air temperature of the air conditioner.

[0019] In an embodiment, the control unit re-determining a second quantity of heat production of the air conditioner and a second thermal load of the building in the environment where the air conditioner is arranged, includes: obtaining an assumed temperature of the constant temperature space required by the user to function as a second constant temperature, and obtaining the outdoor ambient temperature and the outlet air temperature of the air conditioner; calculating a second thermal load of the building according to the second constant temperature and the outdoor ambient temperature, and calculating a second quantity of heat production of the air conditioner according to the second constant temperature and the outlet air temperature of the air conditioner. If the first quantity of heat production of the air conditioner is greater than the first thermal load of the building, then the second constant temperature is less than the first constant temperature; and if the first quantity of heat production of the air conditioner is less than the first thermal load of the building, then the second constant temperature is greater than the first constant temperature.

[0020] In an embodiment, the device further includes: the determining unit, further configured to determine whether the self-adaptive mode selected by the user has been received after the air conditioner is turned on; the control unit, further configured to directly determine the set indoor temperature according to the set self-adaptive mode if it is determined that the self-adaptive mode selected by the user has been received after the air conditioner is turned on; the control unit, further configured to determine whether the set self-adaptive mode is activated according to stored information in a memory mode of the air conditioner if it is determined that the self-adaptive mode selected by the user is not received after the air conditioner is turned on. The memory mode includes determining whether the set self-adaptive mode is activated according to a time difference between user's two adjustments for the set indoor temperature and an indoor temperature difference.

[0021] In an embodiment, the control unit determining whether the set self-adaptive mode is activated according to

the stored information in the memory mode of the air conditioner includes: determining the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference; determining whether the time difference is less than or equal to a set time threshold, and whether the indoor temperature difference is less than or equal to the set temperature threshold; if the time difference is less than or equal to the set time threshold, and if the indoor temperature difference is less than or equal to the set temperature threshold, then sending a reminder message to remind the user of deciding to select the self-adaptive mode or not, and resetting each set time, each set temperature, and each indoor temperature stored in the memory mode, and entering a new memory mode under a condition that it is determined that the user does not select the self-adaptive mode; if the time difference is greater than the set time threshold, or if the indoor temperature difference is greater than the set temperature threshold, then resetting each set time, each set temperature, and each indoor temperature stored in the memory mode, and entering a new memory mode.

[0022] In an embodiment, the control unit determining the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference, includes: obtaining a first set time when the user adjusts the set indoor temperature for a first time, a first set temperature, and a first indoor temperature after the air conditioner operates stably based on the first set temperature, and obtaining a second set time when the user adjusts the set indoor temperature for a second time, a second set temperature, and a second indoor temperature after the air conditioner operates stably based on the second set temperature; determining the time difference between the second set time and the first set time, and the indoor temperature difference between the second indoor temperature and the first set temperature.

[0023] Corresponding to the above device, another aspect of the present application provides an air conditioner, including the device for determining the set indoor temperature described above.

[0024] Corresponding to the above method, another aspect of the present application provides a storage medium, including that: a plurality of instructions are stored in the storage medium; the plurality of instructions are configured to be loaded and executed by a processor to perform the method for determining the set indoor temperature.

[0025] In accordance with the above method, another aspect of the present application provides an air conditioner including: a memory configured to store a plurality of instructions and a processor configured to execute the plurality of instructions. The plurality of instructions are stored in the memory, and loaded and executed by the processor to perform the method for determining the set indoor temperature above.

[0026] In the technical solutions of these embodiments, in the case that the indoor temperature fluctuates greatly, the set temperature of the air conditioner is determined according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, thereby reducing the user's frequent operation for the air conditioner and improving the intelligence degree of the air conditioner.

[0027] Further, in the technical solutions of this application, based on the user's will and according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, the set temperature is determined by the air conditioner by means of the "self-adaption" function, thereby ensuring indoor comfort and enhancing the user's experience.

[0028] Further, in the technical solutions of the present application, in the case that the indoor temperature fluctuates greatly, the set temperature of the air conditioner is determined according to the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference, thereby improving the user's comfort experience and reducing the tediousness of operation.

[0029] Further, in technical solutions of the present application, in the case that the indoor temperature fluctuates greatly due to the user's frequent operation for adjusting the set indoor temperature for the air conditioner, the set temperature of the air conditioner is determined according to the user's will and according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, thereby reducing the user's frequent operation for the air conditioner and achieving the intelligence of the air conditioner.

[0030] Furthermore, in the technical solutions of the present application, in the case that the indoor temperature fluctuates greatly, the set temperature of the air conditioner is determined according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, or the set temperature of the air conditioner is determined according to the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference, thereby ensuring the indoor comfort, reducing the user's frequent operation for the air conditioner, and achieving the intelligence of the air conditioner.

[0031] Therefore, in the technical solutions of the present application, in the case that the indoor temperature fluctuates greatly, the set temperature of the air conditioner is determined according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, or the set temperature of the air conditioner is determined according to the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference, thereby solving the problem of poor comfort experience that a user feels hot and cold from time to time due to frequent adjustments for the set indoor temperature of the air conditioner according to an outdoor temperature. Therefore, the present application overcomes the defects of cumbersome operation processes, low degree of intelligence and poor user experience in the prior art, and achieves the beneficial effects of simple operation processes,

high degree of intelligence and good user experience.

[0032] Other features and advantages of the present application will be described hereafter in the following description, and partly become obvious from the description, or will be understood by implementing the present application.

[0033] The technical solutions of the present application will be further described in detail hereafter by means of the accompanying drawings and embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034]

FIG. 1 is a schematic flowchart of the method for determining a set indoor temperature according to an embodiment of the present application;

FIG. 2 is a schematic flowchart of determining whether a fluctuation in indoor ambient temperatures within a set duration reaches a set fluctuation threshold according to an embodiment of the method of the present application;

FIG. 3 is a schematic flowchart of determining a set indoor temperature based on a set self-adaptive mode according to an embodiment of the method of the present application;

FIG. 4 is a schematic flowchart of determining quantity of heat production of the air conditioner and a thermal load of a building in an environment where the air conditioner is arranged according to an embodiment of the method of the present application;

FIG. 5 is a schematic flowchart of determining a second quantity of heat production of the air conditioner and a second thermal load of the building in an environment where the air conditioner is arranged according to an embodiment of the method of the present application;

FIG. 6 is a schematic flowchart of determining whether the set indoor temperature is determined according to the set self-adaptive mode in accordance with an embodiment of the method of the present application;

FIG. 7 is a schematic flowchart of determining whether the set self-adaptive mode is activated according to stored information in a memory mode of the air conditioner in accordance with an embodiment of the method of the present application;

FIG. 8 is a schematic flowchart of determining a time difference between user's two adjustments for the set indoor temperature and an indoor temperature difference according to an embodiment of the method of the present application;

FIG. 9 is a schematic structural view illustrating a device for determining a set indoor temperature according to an embodiment of the present application;

Fig. 10 is a schematic view showing curves of the set indoor temperature, the indoor temperature and the outdoor temperature varying with time in twenty-four hours of a whole day;

FIG. 11 is a schematic flowchart of realizing a self-adaptive control strategy of an air conditioner for the set temperature according to an embodiment of the air conditioner of the present application;

FIG. 12 is a schematic flowchart of a method for self-adaptively determining the set temperature according to an embodiment of the air conditioner of the present application.

[0035] Referring to the drawings, the reference signs in the embodiments of the present application are as follows: 102-determining unit; 104-control unit.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0036] In order to make the objectives, technical solutions, and advantages of the present application clearer, the technical solutions of the present application will be described clearly and completely in conjunction with specific embodiments of the present application and the accompanying drawings. Obviously, the described embodiments are only a part of the embodiments of the present application, rather than all the embodiments. Based on the embodiments in the present application, all other embodiments obtained by those of ordinary skill in the art without creative work shall fall within the protection scope of the present application.

[0037] According to an embodiment of the present application, a method for determining a set indoor temperature is provided. As shown in FIG. 1, a schematic flowchart of the method according to an embodiment of the present application is shown. The method for determining the set indoor temperature may include Step S110 and Step S120.

[0038] In Step S110, it is determined whether a fluctuation in indoor ambient temperatures within a set duration reaches a set fluctuation threshold.

[0039] In an embodiment, referring to FIG. 2, a schematic flowchart of determining whether a fluctuation in indoor ambient temperatures within a set duration reaches a set fluctuation threshold according to an embodiment of the method of the present application, a special process of Step S110 of determining whether the fluctuation in the indoor ambient

temperatures within the set duration reaches the set fluctuation threshold is further illustrated, and may include Step S210 to Step S230.

[0040] In Step S210, two or more indoor ambient temperatures are obtained at a set time interval within the set duration.

[0041] In Step S220, it is determined whether an absolute value of the difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures is greater than or equal to the set fluctuation threshold.

[0042] In Step S230, if, among the absolute values of the difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures, there is a set number of absolute values greater than or equal to the set fluctuation threshold, then it is determined that the fluctuation in the indoor ambient temperatures within the set duration reaches the set fluctuation threshold.

[0043] Since there is the set number of absolute values among the absolute values of the difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures being greater than or equal to the set fluctuation threshold, it is determined that the fluctuation in the indoor ambient temperatures within the set duration reaches the set fluctuation threshold, so that the determination for the fluctuation in the indoor ambient temperatures is accurate and reliable.

[0044] In Step S120, if the fluctuation reaches the set fluctuation threshold, the set indoor temperature is determined according to a set self-adaptive mode.

[0045] The self-adaptive mode may include: determining the set indoor temperature based on a balance principle of the thermal load of the building and the quantity of heat production of the air conditioner.

[0046] For example, when the air conditioner senses that the user frequently adjusts the set temperature, which causes the indoor temperature fluctuates greatly, based on the user's will and according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, the set temperature is determined by the air conditioner by means of the "self-adaption" function. Therefore, on the one hand, the indoor comfort may be ensured, thereby solving the problem of poor comfort of the air conditioner. On the other hand, the user's frequent operation for the air conditioner may be reduced, thereby realizing the intelligence of the air conditioner, and solving the problem of insufficiently intelligent air conditioner that the user has to frequently adjust the set temperature according to changes of the outdoor temperatures.

[0047] Therefore, when the fluctuation in the indoor ambient temperatures within the set duration reaches the set fluctuation threshold, the set indoor temperature is determined according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, thereby realizing self-adaptively setting of the set indoor temperature, reducing the user's frequent operation and improving the indoor comfort.

[0048] In an embodiment, referring to FIG. 3, a schematic flowchart of determining a set indoor temperature based on a set self-adaptive mode according to an embodiment of the method of the present application, the specific process of Step S120 of determining the set indoor temperature based on the set self-adaptive mode is further illustrated, and may include Step S310 to Step S330.

[0049] In Step S310, the first quantity of heat production of the air conditioner and a first thermal load of the building in the environment where the air conditioner is arranged, are determined. For example, the first quantity of heat production of the air conditioner is determined, and the first thermal load of the building in the environment where the air conditioner is arranged is determined.

[0050] In an embodiment, referring to FIG. 4, a schematic flowchart of determining quantity of heat production of the air conditioner and a thermal load of a building in an environment where the air conditioner is arranged according to an embodiment of the method of the present application, the specific process of Step S310 of determining the first quantity of heat production of the air conditioner and the first thermal load of the building in the environment where the air conditioner is arranged, is further illustrated, and may include Step S410 and Step S420.

[0051] In Step S410, a temperature of constant temperature space required by the user is obtained to function as a first constant temperature (for example, an assumed temperature of a constant temperature space required by the user is obtained to function as the first constant temperature), and an outdoor ambient temperature and the outlet air temperature of the air conditioner are obtained.

[0052] In Step S420, the thermal load of the building is calculated according to the first constant temperature and the outdoor ambient temperature, and the quantity of heat production of the air conditioner is calculated according to the first constant temperature and the outlet air temperature of the air conditioner.

[0053] For example, the air conditioner first assumes that the temperature of the constant temperature space required by the user is $T_{\text{constant temperature1}}$, the thermal load $Q_{\text{thermal load1}}$ of the building is calculated according to $T_{\text{constant temperature1}}$ and T_{outdoor} , the quantity $Q_{\text{heat production1}}$ of heat production of the air conditioner is calculated according to $T_{\text{constant temperature1}}$ and $T_{\text{outlet air}}$, if $|Q_{\text{heat production1}} - Q_{\text{thermal load1}}| \leq \epsilon$, then $T_{\text{constant temperature1}}$ is a final set temperature T_{set} .

[0054] Therefore, by calculating the thermal load of the building according to the outdoor ambient temperature and the temperature of the constant temperature space required by the user functioning as the first constant temperature,

and by calculating the quantity of heat production of the air conditioner according to the first constant temperature and the outlet air temperature of the air conditioner, it is convenient to acquire the thermal load of the building and the quantity of heat production of the air conditioner, and acquired values are accurate.

[0055] In Step S320, it is determined whether the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold.

[0056] In Step S330, if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold, it is determined that the first constant temperature of the constant temperature space required by the user, which is related to both the first quantity of heat production of the air conditioner and the first thermal load of the building, is the set indoor temperature.

[0057] Alternatively, in Step S340, if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is greater than the set load threshold, then a second quantity of heat production of the air conditioner and a second thermal load of the building in the environment where the air conditioner is arranged, are re-determined, and the set indoor temperature is re-determined according to an iterative method, and according to the re-determined second quantity of heat production of the air conditioner and the re-determined second thermal load of the building in the environment where the air conditioner is arranged.

[0058] For example, the air conditioner first assumes that the temperature of the constant temperature space required by the user is $T_{\text{constant temperature1}}$, the thermal load $Q_{\text{thermal load1}}$ of the building is calculated according to $T_{\text{constant temperature1}}$ and T_{outdoor} , the quantity $Q_{\text{heat production1}}$ of heat production of the air conditioner is calculated according to $T_{\text{constant temperature1}}$ and $T_{\text{outlet air}}$, if $|Q_{\text{heat production1}} - Q_{\text{thermal load1}}| > \varepsilon$, then a final temperature $T_{\text{constant temperature n}}$ of the constant temperature space required by the user is determined by the iterative method, so that $|Q_{\text{heat production n}} - Q_{\text{thermal load n}}| \leq \varepsilon$, then $T_{\text{constant temperature n}}$ is the final set temperature T_{set} .

[0059] Therefore, by determining the quantity of heat production of the air conditioner and the thermal load of the building, and by determining the set indoor temperature based on the quantity of heat production of the air conditioner and the thermal load of the building, the determined set indoor temperature is accurate and reliable, which is beneficial to improvement of indoor comfort.

[0060] In an embodiment, referring to FIG. 5, a schematic flowchart of determining a second quantity of heat production of the air conditioner and a second thermal load of the building in an environment where the air conditioner is arranged according to an embodiment of the method of this application, a specific process of Step S340 of re-determining the second quantity of heat production of the air conditioner and the second thermal load of the building in the environment, where the air conditioner is arranged, is further illustrated, and may include Step S510 and Step S520.

[0061] In Step S510, an assumed temperature of the constant temperature space required by the user is obtained and functions as the second constant temperature, and the outdoor ambient temperature and the outlet air temperature of the air conditioner are obtained.

[0062] In Step S520, the second thermal load of the building is calculated according to the second constant temperature and the outdoor ambient temperature, and the second quantity of heat production of the air conditioner is calculated according to the second constant temperature and the outlet air temperature of the air conditioner.

[0063] If the first quantity of heat production of the air conditioner is greater than the first thermal load of the building, then the second constant temperature is less than the first constant temperature. If the first quantity of heat production of the air conditioner is less than the first thermal load of the building, then the second constant temperature is greater than the first constant temperature.

[0064] For example, firstly, the temperature of the constant temperature space required by the user is assumed to be $T_{\text{constant temperature1}}$, the thermal load $Q_{\text{thermal load1}}$ of the building is calculated according to $T_{\text{constant temperature1}}$ and T_{outdoor} , and the quantity of heat production $Q_{\text{heat production1}}$ of the air conditioner is calculated according to $T_{\text{constant temperature1}}$ and $T_{\text{outlet air}}$. If $Q_{\text{heat production1}} > Q_{\text{thermal load1}}$, and the temperature of the constant temperature space required by the user is assumed to be $T_{\text{constant temperature2}}$, then $T_{\text{constant temperature2}} < T_{\text{constant temperature1}}$. If $Q_{\text{heat production1}} < Q_{\text{thermal load1}}$, then $T_{\text{constant temperature2}} > T_{\text{constant temperature1}}$.

[0065] Therefore, the second thermal load of the building and the second quantity of heat production of the air conditioner are re-determined according to the magnitude relationship between the first quantity of heat production of the air conditioner and the first thermal load of the building, and further the set indoor temperature is re-determined, so as to find out a more accurate set indoor temperature and better improve the indoor comfort.

[0066] In an embodiment, a process of determining whether the set indoor temperature is determined according to the set self-adaptive mode is further included.

[0067] Referring to FIG. 6, a schematic flowchart of determining whether the set indoor temperature is determined according to the set self-adaptive mode in accordance with an embodiment of the method of the present application, the specific process of determining whether the set indoor temperature is determined according to the set self-adaptive mode is further illustrated, and may include Step S610 to Step S630.

[0068] In Step S610, it is determined whether the self-adaptive mode selected by the user has been received after the air conditioner is turned on.

[0069] In Step S620, if it is determined that the self-adaptive mode selected by the user has been received after the air conditioner is turned on, then the set indoor temperature is directly determined according to the set self-adaptive mode.

[0070] For example, after the air conditioner is turned on, if the user selects the "self-adaption" function, the air conditioner directly determines the set temperature based on the "self-adaptive" method.

[0071] For example, if the user selects the "self-adaption" function, then the set temperature is determined according to the "self-adaption" function, and then the memory of the air conditioner is reset and information is re-stored.

[0072] Alternatively, in Step S630, if it is determined that the self-adaptive mode selected by the user is not received after the air conditioner is turned on, then it is determined whether the set self-adaptive mode is activated according to the stored information in the memory mode of the air conditioner. Where, the memory mode may include determining whether the set self-adaptive mode is activated according to a time difference between the user's two adjustments for the set indoor temperature and an indoor temperature difference.

[0073] For example, after the air conditioner is turned on, or when the fluctuation reaches the set fluctuation threshold, a determination instruction whether the set indoor temperature is set self-adaptively based on the set self-adaptive mode may be sent. If the feedback result of the determination instruction includes a self-adaptive mode (namely the self-adaptive mode, based on which the set indoor temperature is determined self-adaptively), then the set indoor temperature is determined according to the set self-adaptive mode. If the feedback result of the determination instruction does not include the self-adaptive mode, it is determined whether the set self-adaptive mode is activated according to the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference.

[0074] For another example, a determination instruction whether the set indoor temperature is determined is sent. The set indoor temperature is determined according to the feedback result of the determination instruction. For example, the set indoor temperature is determined according to the feedback result of the user based on the determination instruction. The feedback result may include: determining the self-adaptive mode of the set indoor temperature based on the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, or determining the memory mode of the set indoor temperature based on the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference.

[0075] Therefore, the user selects the self-adaptive mode or not after the air conditioner is turned on. If required, the self-adaptive mode is selectively activated according to the user's requirement, which meets the user's requirements for the control of the air conditioner and is flexible and user-friendly.

[0076] In an embodiment, referring to FIG. 7, a schematic flowchart of determining whether the set self-adaptive mode is activated according to stored information in a memory mode of the air conditioner in accordance with an embodiment of the method of the present application, a specific process of Step S630 of determining whether the set self-adaptive mode is activated according to the stored information in the memory mode of the air conditioner is further illustrated, and may include Step S710 to Step S740.

[0077] In Step S710, the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference are determined.

[0078] In an embodiment, referring to FIG. 8, a schematic flowchart of determining a time difference between user's two adjustments for the set indoor temperature and an indoor temperature difference according to an embodiment of the method of the present application, a specific process of the step S710 of determining the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference is further illustrated, and may include Step S810 and Step S820.

[0079] In Step S810, the first set time when the user adjusts the set indoor temperature for the first time, the first set temperature, and the first indoor temperature after the air conditioner operates stably based on the first set temperature, are obtained, and the second set time when the user adjusts the set indoor temperature for the second time, the second set temperature, and the second indoor temperature after the air conditioner operates stably based on the second set temperature, are obtained.

[0080] In Step S820, the time difference between the second set time and the first set time, and the indoor temperature difference between the second indoor temperature and the first set temperature are determined.

[0081] Therefore, by obtaining the time when the user adjusts the set indoor temperature twice, the set temperatures, and the indoor temperatures after the air conditioner operates stably, the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference are determined, so that the determination of the time difference between the user's two adjustments for the set indoor temperature and the determination of the indoor temperature difference are accurate and reliable, which is beneficial to the accurate and reliable determination of activating the self-adaptive mode or not.

[0082] In Step S720, it is determined whether the time difference is less than or equal to the set time threshold, and whether the indoor temperature difference is less than or equal to the set temperature threshold.

[0083] In Step S730, if the time difference is less than or equal to the set time threshold, and if the indoor temperature difference is less than or equal to the set temperature threshold, then a reminder message is sent to remind the user of deciding to select the self-adaptive mode or not, and then each set time, each set temperature, and each indoor tem-

perature stored in the memory mode are reset to enter a new memory mode under the condition that it is determined that the user does not select the self-adaptive mode.

[0084] For example, based on the memory function, the air conditioner stores the time t_1 when the user adjusts the set temperature for the first time, the set temperature T_{set1} , and the indoor temperature $T_{indoor1}$ after it is stabilized, and then the air conditioner stores the time t_2 when the user adjusts the set temperature for the second time, the set temperature T_{set2} , and the indoor temperature $T_{indoor2}$ after it is stabilized. The time difference $\Delta t_{2-1}=t_2-t_1$ and the indoor temperature difference $\Delta T_{indoor(2-1)}=T_{indoor2}-T_{indoor1}$ are calculated for the two adjustments for the indoor temperature. Δt_{2-1} is compared with the first preset threshold Δt , and $\Delta T_{indoor(2-1)}$ is compared with the second preset threshold ΔT_{indoor} . If $\Delta t_{2-1} \leq \Delta t$, and $\Delta T_{indoor(2-1)} \leq \Delta T_{indoor}$, then the "self-adaption" function key of the remote control flashes to remind the user of deciding to select the "self-adaption" function or not. If the user does not select the "self-adaption" function, the memory of the air conditioner will be reset and information is re-stored.

[0085] Alternatively, in Step S740, if the time difference is greater than the set time threshold, or if the indoor temperature difference is greater than the set temperature threshold, then each set time, each set temperature, and each indoor temperature stored in the memory mode are reset to enter a new memory mode.

[0086] For example, if $\Delta t_{2-1} > \Delta t$, or $\Delta T_{indoor(2-1)} > \Delta T_{indoor}$, then the memory of the air conditioner is reset and information is re-stored.

[0087] Therefore, by determining whether the self-adaptive mode needs to be activated according to the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference, the set indoor temperature is determined according to the self-adaptive mode with the user's permission to improve the indoor comfort, thereby not only satisfying the control need of the user, but also meeting the comfort need of the user. The method has high reliability and good humanization.

[0088] In the technical solutions of these embodiments, in the case that the indoor temperature fluctuates greatly, the set temperature of the air conditioner is determined according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner. Proved by a large number of experiments, the solutions may reduce the user's frequent operation for the air conditioner, and improve the intelligence degree of the air conditioner.

[0089] According to an embodiment of the present application, a device for determining the set indoor temperature corresponding to the method for determining the set indoor temperature is also provided. Referring to FIG. 9, a schematic structural view illustrating a device for determining a set indoor temperature according to an embodiment of the present application, the device for determining the set indoor temperature may include a determining unit 102 and a control unit 104.

[0090] In an embodiment, the determining unit 102 is configured to determine whether a fluctuation in indoor ambient temperatures within a set duration reaches a set fluctuation threshold. For specific functions and processing of the determining unit 102, refer to Step S110.

[0091] In an embodiment, the determining unit 102 determining whether the fluctuation in the indoor ambient temperatures within a set duration reaches a set fluctuation threshold may further include: the determining unit 102, configured to obtain two or more indoor ambient temperatures at a set time interval within the set duration. For specific functions and processing of the determining unit 102, refer to Step S210.

[0092] The determining unit 102 may also be specifically configured to determine whether an absolute value of the difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures is greater than or equal to the set fluctuation threshold. For specific functions and processing of the determining unit 102, refer to Step S220.

[0093] The determining unit 102 may also be specifically configured to, if there is a set number of absolute values, among the absolute values of the difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures, and greater than or equal to the set fluctuation threshold, determine that the fluctuation in the indoor ambient temperatures within the set duration reaches the set fluctuation threshold. For specific functions and processing of the determining unit 102, refer to Step S230.

[0094] Therefore, according to the set number of absolute values among the absolute values of the difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures being greater than or equal to the set fluctuation threshold, it is determined that the fluctuation in the indoor ambient temperatures within the set duration reaches the set fluctuation threshold, so that the determination for the fluctuation in the indoor ambient temperatures is accurate and reliable.

[0095] In an embodiment, the control unit 104 is configured to, if the fluctuation reaches the set fluctuation threshold, determine the set indoor temperature according to a set self-adaptive mode. For specific functions and processing of the control unit 104, refer to Step S120.

[0096] The self-adaptive mode may include: determining the set indoor temperature based on a balance principle of the thermal load of the building and the quantity of heat production of the air conditioner.

[0097] For example, when the air conditioner senses that the user frequently adjusts the set temperature, which causes the indoor temperature to fluctuate greatly, based on the user's will and according to the balance principle of the thermal

load of the building and the quantity of heat production of the air conditioner, the set temperature is determined by the air conditioner by means of the "self-adaption" function. Therefore, on the one hand, the indoor comfort may be ensured, thereby solving the problem of poor comfort of the air conditioner. On the other hand, the user's frequent operation for the air conditioner may be reduced, thereby realizing the intelligence of the air conditioner, and solving the problem of insufficiently intelligent air conditioner that the user has to frequently adjust the set temperature according to changes of the outdoor temperatures.

[0098] Therefore, when the fluctuation in the indoor ambient temperatures within the set duration reaches the set fluctuation threshold, the set indoor temperature is self-adaptively set according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, thereby reducing the user's frequent operation and improving the indoor comfort.

[0099] In an embodiment, the control unit 104 determining the set indoor temperature according to a set self-adaptive mode may specifically include:

[0100] the control unit 104, specifically configured to determine the first quantity of heat production of the air conditioner and a first thermal load of the building in the environment where the air conditioner is arranged. For specific functions and processing of the control unit 104, refer to step S310.

[0101] In an embodiment, the control unit 104 determining the first quantity of heat production of the air conditioner and the first thermal load of the building of the environment to which the air conditioner belongs may include:

[0102] the control unit 104, specifically configured to obtain a temperature of constant temperature space required by the user to function as a first constant temperature, and to obtain an outdoor ambient temperature and the outlet air temperature of the air conditioner. For the specific functions and processing of the control unit 104, refer to Step S410.

[0103] The control unit 104 may also be specifically configured to calculate the thermal load of the building according to the first constant temperature and the outdoor ambient temperature, and to calculate the quantity of heat production of the air conditioner according to the first constant temperature and the outlet air temperature of the air conditioner. For specific functions and processing of the control unit 104, refer to Step S420.

[0104] For example, the air conditioner first assumes that the temperature of the constant temperature space required by the user is $T_{\text{constant temperature1}}$, the thermal load $Q_{\text{thermal load1}}$ of the building is calculated according to $T_{\text{constant temperature1}}$ and T_{outdoor} , the quantity $Q_{\text{heat production1}}$ of heat production of the air conditioner is calculated according to $T_{\text{constant temperature1}}$ and $T_{\text{outlet air}}$, if $|Q_{\text{heat production1}} - Q_{\text{thermal load1}}| \leq \varepsilon$, then $T_{\text{constant temperature1}}$ is a final set temperature T_{set} .

[0105] Therefore, by calculating the thermal load of the building according to the outdoor ambient temperature and the temperature of the constant temperature space required by the user functioning as the first constant temperature, and by calculating the quantity of heat production of the air conditioner according to the first constant temperature and the outlet air temperature of the air conditioner, it is convenient to acquire the thermal load of the building and the quantity of heat production of the air conditioner, and acquired values are accurate.

[0106] The control unit 104 may also be specifically configured to determine whether the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold. For specific functions and processing of the control unit 104, refer to Step S320.

[0107] The control unit 104 may also be specifically configured to, if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold, determine that the first constant temperature of the constant temperature space required by the user, which is related to both the first quantity of heat production of the air conditioner and the first thermal load of the building, is the set indoor temperature. For specific functions and processing of the control unit 104, refer to Step S330.

[0108] Alternatively, the control unit 104 may also be specifically configured to, if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is greater than the set load threshold, re-determine a second quantity of heat production of the air conditioner and the second thermal load of the building in the environment where the air conditioner is arranged, and re-determine the set indoor temperature according to an iterative method, and according to the re-determined second quantity of heat production of the air conditioner and the re-determined second thermal load of the building in the environment where the air conditioner is arranged. For specific functions and processing of the control unit 104, refer to Step S340.

[0109] For example, the air conditioner first assumes that the temperature of the constant temperature space required by the user is $T_{\text{constant temperature1}}$, the thermal load $Q_{\text{thermal load1}}$ of the building is calculated according to $T_{\text{constant temperature1}}$ and T_{outdoor} , the quantity $Q_{\text{heat production1}}$ of heat production of the air conditioner is calculated according to $T_{\text{constant temperature1}}$ and $T_{\text{outlet air}}$, if $|Q_{\text{heat production1}} - Q_{\text{thermal load1}}| > \varepsilon$, then a final temperature $T_{\text{constant temperature n}}$ of the constant temperature space is determined by the iterative method, so that $|Q_{\text{heat production n}} - Q_{\text{thermal load n}}| \leq \varepsilon$, then $T_{\text{constant temperature n}}$ is the final set temperature T_{set} .

[0110] Therefore, by determining the quantity of heat production of the air conditioner and the thermal load of the building, and by determining the set indoor temperature based on the quantity of heat production of the air conditioner and the thermal load of the building, the determined set indoor temperature is accurate and reliable, which is beneficial

to improvement of indoor comfort.

[0111] In an embodiment, the control unit 104 re-determining the second quantity of heat production of the air conditioner and re-determining the second thermal load of the building of the environment where the air conditioner is arranged, may include:

the control unit 104, specifically configured to obtain the assumed temperature of the constant temperature space required by the user to function as the second constant temperature, and obtain the outdoor ambient temperature and the outlet air temperature of the air conditioner. For specific functions and processing of the control unit 104, refer to Step S510.

[0112] The control unit 104 may also be specifically configured to calculate the second thermal load of the building according to the second constant temperature and the outdoor ambient temperature, and calculate the second quantity of heat production of the air conditioner according to the second constant temperature and the outlet air temperature of the air conditioner. For specific functions and processing of the control unit 104, refer to Step S520.

[0113] If the first quantity of heat production of the air conditioner is greater than the first thermal load of the building, then the second constant temperature is less than the first constant temperature. If the first quantity of heat production of the air conditioner is less than the first thermal load of the building, then the second constant temperature is greater than the first constant temperature.

[0114] For example, the temperature of the constant temperature space required by the user is firstly assumed to be $T_{\text{constant temperature1}}$, the thermal load $Q_{\text{thermal load1}}$ of the building is calculated according to $T_{\text{constant temperature1}}$ and T_{outdoor} , and the quantity $Q_{\text{heat production1}}$ of heat production of the air conditioner is calculated according to $T_{\text{constant temperature1}}$ and $T_{\text{outlet air}}$. If $Q_{\text{heat production1}} > Q_{\text{thermal load1}}$, and the temperature of the constant temperature space required by the user is assumed to be $T_{\text{constant temperature2}}$, then $T_{\text{constant temperature2}} < T_{\text{constant temperature1}}$. If $Q_{\text{heat production1}} < Q_{\text{thermal load1}}$, then $T_{\text{constant temperature2}} > T_{\text{constant temperature1}}$.

[0115] Therefore, the second thermal load of the building and the second quantity of heat production of the air conditioner are re-determined according to the magnitude relationship between the first quantity of heat production of the air conditioner and the first thermal load of the building, and further the set indoor temperature is re-determined, so as to find out a more accurate set indoor temperature and better improve the indoor comfort.

[0116] In an embodiment, a process of determining whether the set indoor temperature is determined according to the set self-adaptive mode is further included, which is specifically as follows.

[0117] The determining unit 102 may also be specifically configured to determine whether the self-adaptive mode selected by the user has been received after the air conditioner is turned on. For specific function and processing of the determining unit 102, refer to Step S610.

[0118] The control unit 104 may also be specifically configured to, if it is determined that the self-adaptive mode selected by the user has been received after the air conditioner is turned on, directly determine the set indoor temperature according to the set self-adaptive mode. For specific functions and processing of the control unit 104, refer to Step S620.

[0119] For example, after the air conditioner is turned on, if the user selects the "self-adaption" function, the air conditioner directly determines the set temperature based on the "self-adaptive" method.

[0120] For example, if the user selects the "self-adaption" function, then the set temperature is determined according to the "self-adaption" function, and then the memory of the air conditioner is reset and information is re-stored.

[0121] Alternatively, the control unit 104 may also be specifically configured to, if it is determined that the self-adaptive mode selected by the user is not received after the air conditioner is turned on, determine whether the set self-adaptive mode is activated according to the stored information in the memory mode of the air conditioner. Where, the memory mode may include determining whether the set self-adaptive mode is activated according to a time difference between the user's two adjustments for the set indoor temperature and an indoor temperature difference. For the specific functions and processing of the control unit 104, refer to Step S630.

[0122] For example, after the air conditioner is turned on, or when the fluctuation reaches the set fluctuation threshold, a determination instruction whether the set indoor temperature is set self-adaptively based on the set self-adaptive mode may be sent. If the feedback result of the determination instruction includes a self-adaptive mode (namely the self-adaptive mode, based on which the set indoor temperature is determined self-adaptively), then the set indoor temperature is determined according to the set self-adaptive mode. If the feedback result of the determination instruction does not include the self-adaptive mode, it is determined whether the set self-adaptive mode is activated according to the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference.

[0123] For another example, a determination instruction whether the set indoor temperature is determined is sent. The set indoor temperature is determined according to the feedback result of the determination instruction. For example, the set indoor temperature is determined according to the feedback result of the user based on the determination instruction. The feedback result may include: determining the self-adaptive mode of the set indoor temperature based on the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, or determining the memory mode of the set indoor temperature based on the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference.

[0124] Therefore, the user selects the self-adaptive mode or not after the air conditioner is turned on. If required, the self-adaptive mode is selectively activated according to the user's requirement, which meets the user's requirements for the control of the air conditioner and is flexible and user-friendly.

[0125] In an embodiment, the control unit 104 determining whether the set self-adaptive mode is activated according to the stored information in the memory mode of the air conditioner, may include:

[0126] the control unit 104, specifically configured to determine the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference. For specific functions and processing of the control unit 104, refer to Step S710.

[0127] In an embodiment, the control unit 104 determining the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference may include:

[0128] the control unit 104, specifically configured to obtain the first set time when the user adjusts the set indoor temperature for the first time, the first set temperature, and the first indoor temperature after the air conditioner operates stably based on the first set temperature, and obtain the second set time when the user adjusts the set indoor temperature for the second time, the second set temperature, and the second indoor temperature after the air conditioner operates stably based on the second set temperature. For specific functions and processing of the control unit 104, refer to Step S810.

[0129] The control unit 104 may also be specifically configured to determine the time difference between the second set time and the first set time, and the indoor temperature difference between the second indoor temperature and the first set temperature. For specific functions and processing of the control unit 104, refer to Step S820.

[0130] Therefore, by obtaining the time when the user adjusts the set indoor temperature twice, the set temperatures, and the indoor temperatures after the air conditioner operates stably, the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference are determined, so that the determination of the time difference between the user's two adjustments for the set indoor temperature and the determination of the indoor temperature difference are accurate and reliable, which is beneficial to the accurate and reliable determination of activating the self-adaptive mode or not.

[0131] The control unit 104 may also be specifically configured to determine whether the time difference is less than or equal to the set time threshold, and whether the indoor temperature difference is less than or equal to the set temperature threshold. For specific functions and processing of the control unit 104, refer to Step S720.

[0132] The control unit 104 may also be specifically configured to, if the time difference is less than or equal to the set time threshold, and if the indoor temperature difference is less than or equal to the set temperature threshold, send a reminder message to remind the user of deciding to select the self-adaptive mode or not, and reset each set time, each set temperature, and each indoor temperature stored in the memory mode to enter a new memory mode under the condition that it is determined that the user does not select the self-adaptive mode. For specific functions and processing of the control unit 104, refer to Step S730.

[0133] For example, based on the memory function, the air conditioner stores the time t_1 when the user adjusts the set temperature for the first time, the set temperature T_{set1} , and the indoor temperature $T_{indoor1}$ after it is stabilized, and then the air conditioner stores the time t_2 when the user adjusts the set temperature for the second time, the set temperature T_{set2} , the indoor temperature $T_{indoor2}$ after it is stabilized. The time difference $\Delta t_{2-1}=t_2-t_1$ and the indoor temperature difference $\Delta T_{indoor(2-1)}=T_{indoor2}-T_{indoor1}$ are calculated for the two adjustments for indoor temperature. Δt_{2-1} is compared with the first preset threshold Δt , and $\Delta T_{indoor(2-1)}$ is compared with the second preset threshold ΔT_{indoor} . If $\Delta t_{2-1} \leq \Delta t$, and $\Delta T_{indoor(2-1)} \leq \Delta T_{indoor}$, then the "self-adaption" function key of the remote control flashes to remind the user of deciding to select the "self-adaption" function or not. If the user does not select the "self-adaption" function, the memory of the air conditioner will be reset and information is re-stored.

[0134] Alternatively, the control unit 104 may also be specifically configured to, if the time difference is greater than the set time threshold, or if the indoor temperature difference is greater than the set temperature threshold, reset each set time, each set temperature, and each indoor temperature stored in the memory mode to enter a new memory mode. For specific functions and processing of the control unit 104, refer to Step S740.

[0135] For example if $\Delta t_{2-1} > \Delta t$, or $\Delta T_{indoor(2-1)} > \Delta T_{indoor}$, then the memory of the air conditioner is reset and information is re-stored.

[0136] Therefore, by determining whether the self-adaptive mode needs to be activated according to the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference, the set indoor temperature is determined according to the self-adaptive mode with the user's permission to improve the indoor comfort, thereby not only satisfying the control need of the user, but also meeting the comfort need of the user. The method has high reliability and good humanization.

[0137] Since the processing and functions performed by the devices of these embodiments basically correspond to the embodiments, principles, and examples of the methods shown in FIGS. 1 to 8, for those not described in detail in these embodiments, please refer to relevant description in the foregoing embodiments, and they will not be described hereafter repeatedly.

[0138] In the technical solutions of the present application, based on the user's will and according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, the set temperature is determined by the air conditioner by means of the "self-adaption" function. Proved by a large number of experiments, the present application can ensure indoor comfort and enhance the user's experience.

[0139] According to an embodiment of the present application, an air conditioner corresponding to the device for determining the set indoor temperature is also provided. The air conditioner may include the device for determining the set indoor temperature described above.

[0140] In an embodiment, the solution of the present application provides a self-adaptive control strategy of the air conditioner for the set temperature based on the user's will and according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, which enables the air conditioner to determine the set temperature by means of the "self-adaption" function. Therefore, on the one hand, the indoor comfort may be ensured, thereby solving the problem of poor comfort of the air conditioner. On the other hand, the user's frequent operation for the air conditioner may be reduced, thereby realizing the intelligence of the air conditioner, and solving the problem of insufficiently intelligent air conditioner that the user has to frequently adjust the set temperature according to changes of the outdoor temperatures.

[0141] For example, when the air conditioner senses that the user frequently adjusts the set temperature, which causes the indoor temperature to fluctuate greatly, based on the user's will and according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, the set temperature is determined by the air conditioner by means of the "self-adaption" function. On the one hand, the indoor comfort may be ensured. On the other hand, the user's frequent operation for the air conditioner may be reduced, thereby realizing the intelligence of the air conditioner.

[0142] In an embodiment, referring to the examples shown in FIG. 11 and FIG. 12, the specific implementation process of the solutions of the present application will be illustrated.

[0143] FIG. 10 may show curves of the set indoor temperature, the indoor temperature and the outdoor temperature varying with time in twenty-four hours of a whole day. In FIG. 10, the curves are all represented by black solid lines due to a large number of data points, and the name of each curve is indicated by an arrow.

[0144] In an embodiment, in the solution of the present application, when the air conditioner senses that the user frequently adjusts the set temperature, which causes the indoor temperature to fluctuate greatly, based on the user's will and according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, the set temperature is determined by the air conditioner by means of the "self-adaption" function. On the one hand, the indoor comfort may be ensured. On the other hand, the user's frequent operation for the air conditioner may be reduced, thereby realizing the intelligence of the air conditioner.

[0145] In an embodiment, the solution of the present application may also relate to a remote control with an "self-adaption" function.

[0146] In addition, the solution of the present application differs from a conventional air conditioner in that: the solution of the present application has an infrared detection function, and includes a humidity sensor and a temperature sensing bulb for outlet air.

[0147] For example, the infrared detection function is configured to detect a heat transfer coefficient of the space enclosing structure and the heat transfer area of the space enclosing structure. The humidity sensor is configured to detect the air humidity. These detected parameters may be used to calculate a thermal load of the building and quantity of heat production of the air conditioner.

[0148] In an embodiment, referring to the examples shown in FIG. 11 and FIG. 12, the main control mode of the solution of the present application may be as follows.

[0149] After the air conditioner is turned on, if the user selects the "self-adaption" function, the air conditioner will directly determine the set temperature based on the "self-adaptive" method. Otherwise, the air conditioner stores the time t_1 when the user adjusts the set temperature for the first time, the set temperature T_{set1} , and the indoor temperature $T_{indoor1}$ after it is stabilized, and then the air conditioner stores the time t_2 when the user adjusts the set temperature for the second time, the set temperature T_{set2} , the indoor temperature $T_{indoor2}$ after it is stabilized. The time difference $\Delta t_{2-1} = t_2 - t_1$ and the indoor temperature difference $\Delta T_{indoor(2-1)} = T_{indoor2} - T_{indoor1}$ are calculated for the two adjustments for indoor temperature. Δt_{2-1} is compared with the first preset threshold Δt , and $\Delta T_{indoor(2-1)}$ is compared with the second preset threshold ΔT_{indoor} . If $\Delta t_{2-1} \leq \Delta t$, and $\Delta T_{indoor(2-1)} \leq \Delta T_{indoor}$, then the "self-adaption" function key of the remote control flashes to remind the user of deciding to select the "self-adaption" function or not. If the user does not select the "self-adaption" function, the memory of the air conditioner will be reset and information is re-stored.

[0150] If the user selects the "self-adaption" function, then the set temperature is determined according to the "self-adaption" function, and then the memory of the air conditioner is reset and information is re-stored.

[0151] In an embodiment, if $\Delta t_{2-1} > \Delta t$, or $\Delta T_{indoor(2-1)} > \Delta T_{indoor}$, then the memory of the air conditioner is reset and information is re-stored.

[0152] In an embodiment, the method for adaptively determining the temperature is as follows.

[0153] The air conditioner first assumes that the temperature of the constant temperature space required by the user is $T_{\text{constant temperature1}}$, the thermal load $Q_{\text{thermal load1}}$ of the building is calculated according to $T_{\text{constant temperature1}}$ and T_{outdoor} , the quantity $Q_{\text{heat production1}}$ of heat production of the air conditioner is calculated according to $T_{\text{constant temperature1}}$ and $T_{\text{outlet air}}$, if $|Q_{\text{heat production1}} - Q_{\text{thermal load1}}| \leq \varepsilon$, then $T_{\text{constant temperature1}}$ is a final set temperature T_{set} . If $Q_{\text{heat production1}} > Q_{\text{thermal load1}}$, and the temperature of the constant temperature space required by the user is assumed to be $T_{\text{constant temperature2}}$, then $T_{\text{constant temperature2}} < T_{\text{constant temperature1}}$. If $Q_{\text{heat production1}} < Q_{\text{thermal load1}}$, then $T_{\text{constant temperature2}} > T_{\text{constant temperature1}}$, and a final temperature $T_{\text{constant temperature n}}$ of the constant temperature space is determined by the iterative method, so that $|Q_{\text{heat production n}} - Q_{\text{thermal load n}}| \leq \varepsilon$, then $T_{\text{constant temperature n}}$ is the final set temperature T_{set} .

[0154] For example, the temperature of the constant temperature space required by the user is $T_{\text{constant temperature 1}}$, which can include: if $T_{\text{set1}} < T_{\text{set2}}$, then $T_{\text{set1}} < T_{\text{constant temperature1}} < T_{\text{set2}}$; if $T_{\text{set1}} > T_{\text{set2}}$, then $T_{\text{set2}} < T_{\text{constant temperature 1}} < T_{\text{set1}}$.

[0155] For example, the final temperature $T_{\text{constant temperature n}}$ of the constant temperature space is determined by the iterative method as follows. A numerical calculation method is used herein. For example, when a computer is used to solve a binary linear equation, an initial value x_0 is assumed first to serve as a solution, then reduce a range of the solution x according to an obtained difference between the obtained value y_0 and the original value Y , and then iteratively calculate x , so that y_n keeps approaching the value Y until the final solution is obtained.

[0156] Specifically, the set temperature may be determined by referring to the following formulas.

$$Q_{\text{thermal load}} = KF (T_{\text{indoor}} - T_{\text{outdoor}});$$

$$Q_{\text{heat production}} = H_{\text{out}} - H_{\text{in}} = q_m \times (h_{\text{outlet air}} - h_{\text{inlet air}});$$

$$q_m = \frac{q_v \times \rho_s \times 1000}{3600};$$

$$\rho_s = \frac{P_a(1+d)}{461(273.15 + T_{\text{outlet air}})(0.622 + d)};$$

$$h = 1.01T + d \times (2500 + 1.84T) .$$

[0157] For example, during calculation of the thermal load, the final value of T_{indoor} is the value of $T_{\text{constant temperature1}}$. During calculation of the quantity of the heat production, $h_{\text{inlet air}}$ is calculated according to $T_{\text{inlet air}}$, and the value of $T_{\text{inlet air}}$ is consistent with the value of $T_{\text{constant temperature1}}$.

[0158] Where, ε denotes a user's acceptable deviation between the thermal load and the quantity of heat production, and is determined by experiments. The first preset threshold Δt , the second preset threshold ΔT_{indoor} are determined by experiments. $Q_{\text{thermal load}}$ denotes the thermal load of the building, the unit thereof may be W, and it is calculated according to the outdoor temperature and indoor temperature after the space enclosing structure is determined. $Q_{\text{heat production}}$ denotes the quantity of heat production of the air conditioner, the unit thereof may be W, and it may be expressed by a difference between the enthalpy values of the inlet air and the outlet air. $T_{\text{constant temperature1}}$: if $T_{\text{set1}} < T_{\text{set2}}$, then $T_{\text{set1}} < T_{\text{constant temperature1}} < T_{\text{set2}}$; if $T_{\text{set1}} > T_{\text{set2}}$, then $T_{\text{set2}} < T_{\text{constant temperature1}} < T_{\text{set1}}$. K denotes a heat transfer coefficient of the space enclosing structure, the unit thereof may be $W/(m^2 \cdot K)$, and it may be obtained according to the infrared detection function or a user's input. F denotes the heat transfer area of the space enclosing structure, the unit thereof may be m^2 , and it may be obtained according to the infrared detection function or a user's input. T_{indoor} denotes an indoor temperature, the unit thereof may be K, and it is an assumed value $T_{\text{constant temperature}}$ of the constant temperature space. T_{outdoor} denotes an outdoor temperature, the unit thereof may be K, and it is detected by a temperature sensing bulb for the outdoor environment. H_{in} and H_{out} denote the enthalpy values of the inlet air the outlet air of the indoor unit, respectively, the unit thereof may be J/s, and they are obtained from the air mass flow rate and the specific enthalpy value. q_m denotes an air mass flow rate, the unit thereof may be g/s, and it is obtained from an air volume flow rate q_v and a density ρ_s . q_v denotes an air volume flow rate, the unit thereof may be m^3/h , and it is determined by looking up a table of air level and air volume flow rate according to the air level. ρ_s denotes a density, the unit thereof may be kg/m^3 , and it is calculated from the outlet air temperature, an atmospheric pressure and humidity. $h_{\text{air inlet}}$ and $h_{\text{air outlet}}$ denote the specific enthalpy values of inlet air and outlet air of the indoor unit, respectively, the unit thereof may be J/g,

and they are calculated from the inlet and outlet air temperatures and moisture contents. The inlet air temperature is the indoor ambient temperature, and here it is an assumed value T_{constant} temperature of the constant temperature space. The outlet air temperature is measured by a temperature sensing bulb for the outlet air, and the humidity is measured by a humidity sensor. $T_{\text{outlet air}}$ denotes an outlet air temperature, the unit thereof may be K, and it is detected by a temperature sensing bulb for the outlet air. P_a denotes an atmospheric pressure, the unit thereof may be 101325Pa. d denotes air humidity, the unit thereof may be g/g (dry air), and it is measured by a humidity sensor. T denotes an indoor temperature or an air outlet temperature. The indoor temperature is the assumed value T_{constant} temperature of the constant temperature space, and the unit thereof may be K.

[0159] Table 1, a table of Air Level and Air Flow Rate, rotation rate, is obtained according to experimental measurements, and is different for an air conditioner of a different model.

Table 1: table of Air Level and Air Flow Rate

Air Level	Air Flow Rate (m ³ /h)	Air Level	Air Flow Rate (m ³ /h)
Super Strong	1160	Low to Medium	732
High	1051	Low	638
Medium to High	912	Mute	485
Medium	826		

[0160] Since the processing and functions realized by the air conditioner of these embodiments basically correspond to the embodiment, the principle and the example of the device shown in FIG. 9, and for those not described in detail in these embodiments, please refer to relevant description in the foregoing embodiments, and they will not be described hereafter repeatedly.

[0161] In the technical solutions of the present application, in the case that the indoor temperature fluctuates greatly, the set temperature of the air conditioner is determined according to the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference. Proved by a large number of experiments, the solutions may improve the user's comfort experience and reduce the tediousness of operation.

[0162] According to the embodiments of the present application, a storage medium corresponding to the method for determining the set indoor temperature is also provided. The storage medium may include a plurality of instructions stored in the storage medium, and the plurality of instructions, when are loaded by a processor, execute the above-mentioned method for determining the set indoor temperature.

[0163] Since the processing and functions performed by the storage medium of these embodiments basically correspond to the embodiments, principles, and examples of the methods shown in FIGS. 1 to 8, for those not described in detail in these embodiments, please refer to relevant description in the foregoing embodiments, and they will not be described hereafter repeatedly.

[0164] In technical solutions of the present application, in the case that the indoor temperature fluctuates greatly due to the user's frequent operation for adjusting the set indoor temperature for the air conditioner, the set temperature of the air conditioner is determined according to the user's will and according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner. Proved by a large number of experiments, the solutions may reduce the user's frequent operation for the air conditioner, and achieve the intelligence of the air conditioner.

[0165] According to an embodiment of the present application, an air conditioner corresponding to the method for determining the set indoor temperature is also provided. The air conditioner may include: a processor configured to execute a plurality of instructions; a memory configured to store a plurality of instructions. The plurality of instructions are stored in the memory, and are loaded and executed by the processor to perform the method for determining the set indoor temperature described above.

[0166] Since the processing and functions performed by the air conditioner of these embodiments basically correspond to the embodiments, principles, and examples of the methods shown in FIGS. 1 to 8, for those not described in detail in these embodiments, please refer to relevant description in the foregoing embodiments, and they will not be described hereafter repeatedly.

[0167] In the technical solutions of the present application, in the case that the indoor temperature fluctuates greatly, the set temperature of the air conditioner is determined according to the balance principle of the thermal load of the building and the quantity of heat production of the air conditioner, or the set temperature of the air conditioner is determined according to the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference. Proved by a large number of experiments, the solutions may ensure the indoor comfort, reduce the user's frequent operation for the air conditioner, and achieve the intelligence of the air conditioner.

[0168] In summary, it should be easily understood by those skilled in the art that the above-mentioned advantageous embodiments may be freely combined and superimposed if no conflict occurs.

[0169] What described above are only examples of the present application, but not intended to limit the present application. For those skilled in the art, the application may have various modifications and changes. Any modification, equivalent replacement, improvement, etc. made within the spirit and principle of the present application shall be included in the scope of the claims of the present application.

Claims

1. A method for determining a set indoor temperature, **characterized by** comprising:

determining whether a fluctuation in indoor ambient temperatures within a set duration reaches a set fluctuation threshold;

if the fluctuation reaches the set fluctuation threshold, then determining the set indoor temperature according to a set self-adaptive mode;

wherein, the self-adaptive mode comprises determining the set indoor temperature based on a balance principle of a thermal load of a building and a quantity of heat production of an air conditioner.

2. The method according to claim 1, **characterized in that**, the determining whether the fluctuation in indoor ambient temperatures within the set duration reaches the set fluctuation threshold, comprises:

obtaining two or more indoor ambient temperatures at a set time interval within the set duration;

determining whether an absolute value of a difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures is greater than or equal to the set fluctuation threshold;

if there is a set number of absolute values, among absolute values of the difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures, and greater than or equal to the set fluctuation threshold, then determining that the fluctuation in the indoor ambient temperatures within the set duration reaches the set fluctuation threshold.

3. The method according to claim 1 or 2, **characterized in that**, the determining the set indoor temperature according to the set self-adaptive mode, comprises:

determining a first quantity of heat production of the air conditioner and a first thermal load of the building in an environment where the air conditioner is arranged;

determining whether an absolute value of a difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold;

if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold, then determining that a first constant temperature of constant temperature space required by a user, which is related to both the first quantity of heat production of the air conditioner and the first thermal load of the building, is the set indoor temperature;

if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is greater than the set load threshold, then re-determining a second quantity of heat production of the air conditioner and a second thermal load of the building in the environment where the air conditioner is arranged, and re-determining the set indoor temperature based on an iterative method and according to the re-determined second quantity of heat production of the air conditioner and the re-determined second thermal load of the building in the environment where the air conditioner is arranged.

4. The method according to claim 3, **characterized in that**, the determining the first quantity of heat production of the air conditioner and the first thermal load of the building in the environment where the air conditioner is arranged, comprises:

obtaining a temperature of the constant temperature space required by the user to function as the first constant temperature, and obtaining an outdoor ambient temperature and an outlet air temperature of the air conditioner; calculating the thermal load of the building according to the first constant temperature and the outdoor ambient temperature, and calculating the quantity of heat production of the air conditioner according to the first constant temperature and the outlet air temperature of the air conditioner.

5. The method according to claim 3 or 4, **characterized in that**, the re-determining a second quantity of heat production of the air conditioner and a second thermal load of the building in the environment where the air conditioner is arranged, comprises:

5 obtaining an assumed temperature of the constant temperature space required by the user to function as a second constant temperature, and obtaining the outdoor ambient temperature and the outlet air temperature of the air conditioner;
calculating a second thermal load of the building according to the second constant temperature and the outdoor ambient temperature, and calculating a second quantity of heat production of the air conditioner according to the second constant temperature and the outlet air temperature of the air conditioner;
10 wherein, if the first quantity of heat production of the air conditioner is greater than the first thermal load of the building, then the second constant temperature is less than the first constant temperature; and if the first quantity of heat production of the air conditioner is less than the first thermal load of the building, then the second constant temperature is greater than the first constant temperature.

- 15 6. The method according to any one of claims 1-5, **characterized by** further comprising:

determining whether the self-adaptive mode selected by the user has been received after the air conditioner is turned on;
20 if it is determined that the self-adaptive mode selected by the user has been received after the air conditioner is turned on, then directly determining the set indoor temperature according to the set self-adaptive mode;
if it is determined that the self-adaptive mode selected by the user is not received after the air conditioner is turned on, then determining whether the set self-adaptive mode is activated according to stored information in a memory mode of the air conditioner, wherein, the memory mode comprises determining whether the set self-adaptive mode is activated according to a time difference between user's two adjustments for the set indoor temperature and an indoor temperature difference.

- 25 7. The method according to claim 6, **characterized in that**, the determining whether the set self-adaptive mode is activated according to the stored information in the memory mode of the air conditioner comprises:

30 determining the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference;
determining whether the time difference is less than or equal to a set time threshold, and whether the indoor temperature difference is less than or equal to the set temperature threshold;
35 if the time difference is less than or equal to the set time threshold, and if the indoor temperature difference is less than or equal to the set temperature threshold, then sending a reminder message to remind the user of deciding to select the self-adaptive mode or not, and resetting each set time, each set temperature, and each indoor temperature stored in the memory mode, and entering a new memory mode under a condition that it is determined that the user does not select the self-adaptive mode;
40 if the time difference is greater than the set time threshold, or if the indoor temperature difference is greater than the set temperature threshold, then resetting each set time, each set temperature, and each indoor temperature stored in the memory mode, and entering a new memory mode.

- 45 8. The method according to claim 7, **characterized in that**, the determining the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference, comprises:

obtaining a first set time when the user adjusts the set indoor temperature for a first time, a first set temperature, and a first indoor temperature after the air conditioner operates stably based on the first set temperature, and obtaining a second set time when the user adjusts the set indoor temperature for a second time, a second set temperature, and a second indoor temperature after the air conditioner operates stably based on the second set temperature;
50 determining the time difference between the second set time and the first set time, and the indoor temperature difference between the second indoor temperature and the first set temperature.

- 55 9. A device for determining a set indoor temperature, **characterized by** comprising:

a determining unit, configured to determine whether a fluctuation in indoor ambient temperatures within a set duration reaches a set fluctuation threshold;

a control unit, configured to determine the set indoor temperature according to a set self-adaptive mode if the fluctuation reaches the set fluctuation threshold;
 wherein, the self-adaptive mode comprises determining the set indoor temperature based on a balance principle of a thermal load of a building and a quantity of heat production of an air conditioner.

- 5
 10. The device according to claim 9, **characterized in that**, the determining unit determining whether the fluctuation in indoor ambient temperatures within the set duration reaches the set fluctuation threshold, comprises:

10
 obtaining two or more indoor ambient temperatures at a set time interval within the set duration;
 determining whether an absolute value of a difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures is greater than or equal to the set fluctuation threshold;
 if there is a set number of absolute values, among absolute values of the difference between every two adjacent indoor ambient temperatures in the two or more indoor ambient temperatures, and greater than or equal to the set fluctuation threshold, then determining that the fluctuation in the indoor ambient temperatures within the set
 15
 duration reaches the set fluctuation threshold.

11. The device according to claim 9 or 10, **characterized in that**, the control unit determining the set indoor temperature according to the set self-adaptive mode, comprises:

20
 determining a first quantity of heat production of the air conditioner and a first thermal load of the building in an environment where the air conditioner is arranged;
 determining whether an absolute value of a difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold;
 if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is less than or equal to the set load threshold, then determining that a first
 25
 constant temperature of constant temperature space required by a user, which is related to both the first quantity of heat production of the air conditioner and the first thermal load of the building, is the set indoor temperature;
 if the absolute value of the difference between the first quantity of heat production of the air conditioner and the first thermal load of the building is greater than the set load threshold, then re-determining a second quantity
 30
 of heat production of the air conditioner and a second thermal load of the building in the environment where the air conditioner is arranged, and re-determining the set indoor temperature based on an iterative method and according to the re-determined second quantity of heat production of the air conditioner and the re-determined second thermal load of the building in the environment where the air conditioner is arranged.

- 35
 12. The device according to claim 11, **characterized in that**, the control unit determining the first quantity of heat production of the air conditioner and the first thermal load of the building in the environment where the air conditioner is arranged, comprises:

40
 obtaining a temperature of the constant temperature space required by the user to function as the first constant temperature, and obtaining an outdoor ambient temperature and an outlet air temperature of the air conditioner;
 calculating the thermal load of the building according to the first constant temperature and the outdoor ambient temperature, and calculating the quantity of heat production of the air conditioner according to the first constant temperature and the outlet air temperature of the air conditioner.

- 45
 13. The device according to claim 11 or 12, **characterized in that**, the control unit re-determining a second quantity of heat production of the air conditioner and a second thermal load of the building in the environment where the air conditioner is arranged, comprises:

50
 obtaining an assumed temperature of the constant temperature space required by the user to function as a second constant temperature, and obtaining the outdoor ambient temperature and the outlet air temperature of the air conditioner;
 calculating the second thermal load of the building according to the second constant temperature and the outdoor ambient temperature, and calculating the second quantity of heat production of the air conditioner according to the second constant temperature and the outlet air temperature of the air conditioner;
 55
 wherein, if the first quantity of heat production of the air conditioner is greater than the first thermal load of the building, then the second constant temperature is less than the first constant temperature; and if the first quantity of heat production of the air conditioner is less than the first thermal load of the building, then the second constant temperature is greater than the first constant temperature.

14. The device according to any one of claims 9-13, **characterized by** further comprising:

the determining unit, further configured to determine whether the self-adaptive mode selected by the user has been received after the air conditioner is turned on;

the control unit, further configured to directly determine the set indoor temperature according to the set self-adaptive mode if it is determined that the self-adaptive mode selected by the user has been received after the air conditioner is turned on;

the control unit, further configured to determine whether the set self-adaptive mode is activated according to stored information in a memory mode of the air conditioner if it is determined that the self-adaptive mode selected by the user is not received after the air conditioner is turned on, wherein, the memory mode comprises determining whether the set self-adaptive mode is activated according to a time difference between user's two adjustments for the set indoor temperature and an indoor temperature difference.

15. The device according to claim 14, **characterized in that**, the control unit determining whether the set self-adaptive mode is activated according to the stored information in the memory mode of the air conditioner comprises:

determining the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference;

determining whether the time difference is less than or equal to a set time threshold, and whether the indoor temperature difference is less than or equal to the set temperature threshold;

if the time difference is less than or equal to the set time threshold, and if the indoor temperature difference is less than or equal to the set temperature threshold, then sending a reminder message to remind the user of deciding to select the self-adaptive mode or not, and resetting each set time, each set temperature, and each indoor temperature stored in the memory mode, and entering a new memory mode under a condition that it is determined that the user does not select the self-adaptive mode;

if the time difference is greater than the set time threshold, or if the indoor temperature difference is greater than the set temperature threshold, then resetting each set time, each set temperature, and each indoor temperature stored in the memory mode, and entering a new memory mode.

16. The device according to claim 15, **characterized in that**, the control unit determining the time difference between the user's two adjustments for the set indoor temperature and the indoor temperature difference, comprises:

obtaining a first set time when the user adjusts the set indoor temperature for a first time, a first set temperature, and a first indoor temperature after the air conditioner operates stably based on the first set temperature, and obtaining a second set time when the user adjusts the set indoor temperature for a second time, a second set temperature, and a second indoor temperature after the air conditioner operates stably based on the second set temperature;

determining the time difference between the second set time and the first set time, and the indoor temperature difference between the second indoor temperature and the first set temperature.

17. An air conditioner, **characterized by** comprising the device for determining the set indoor temperature according to any one of claims 9-16.

18. A storage medium, **characterized in that**, a plurality of instructions are stored in the storage medium; the plurality of instructions are loaded and executed by a processor to perform the method for determining the set indoor temperature according to any one of claims 1-8.

19. An air conditioner, **characterized by** comprising:

a processor, configured to execute a plurality of instructions;

a memory, configured to store the plurality of instructions; wherein, the plurality of instructions are stored by the memory, loaded and executed by the processor to perform the method for determining the set indoor temperature according to any one of claims 1-8.

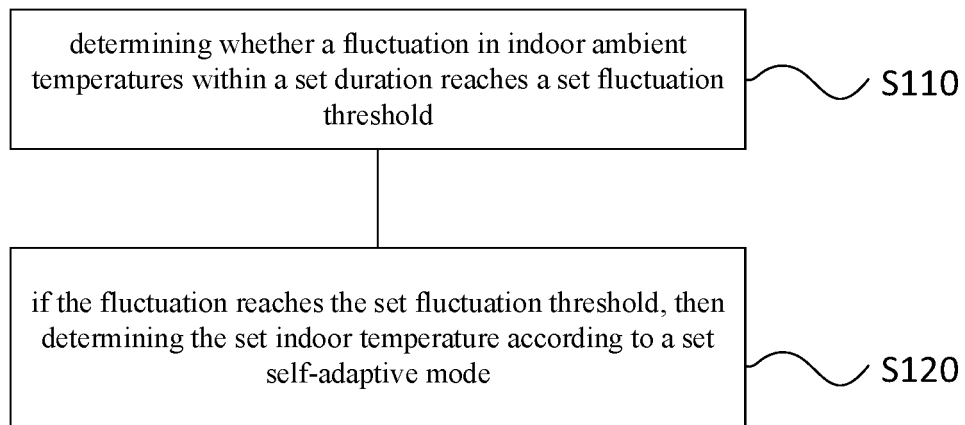


FIG. 1

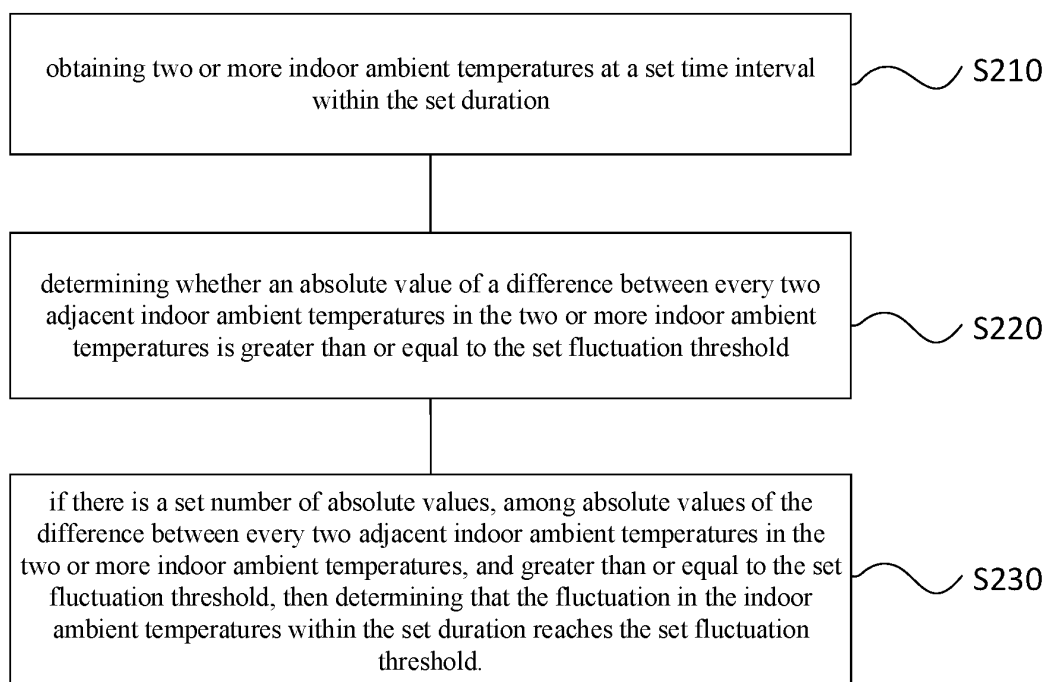


FIG. 2

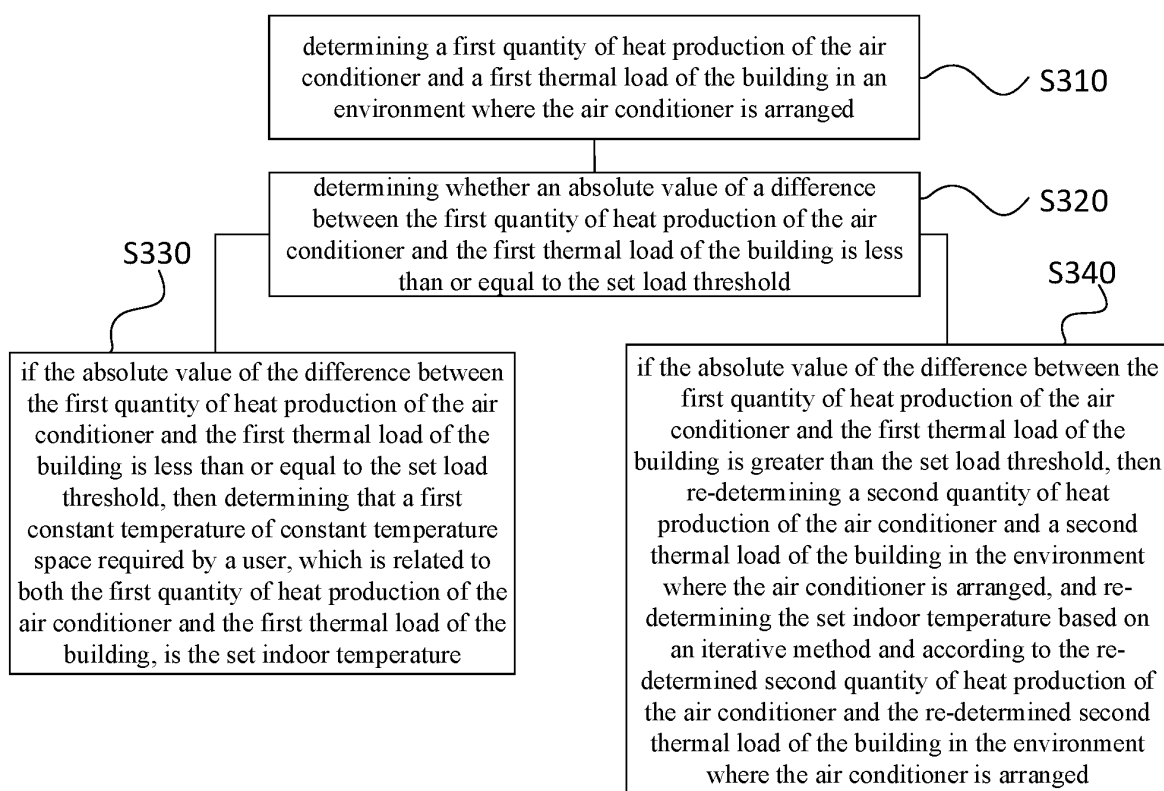


FIG. 3

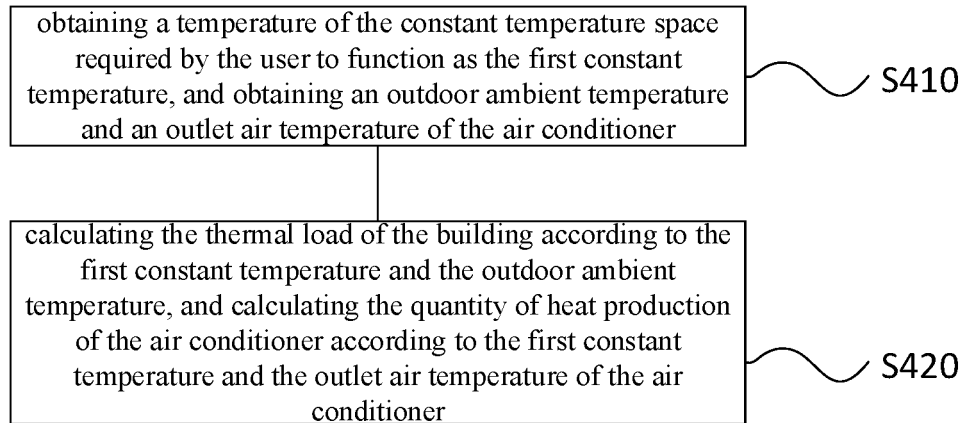


FIG. 4

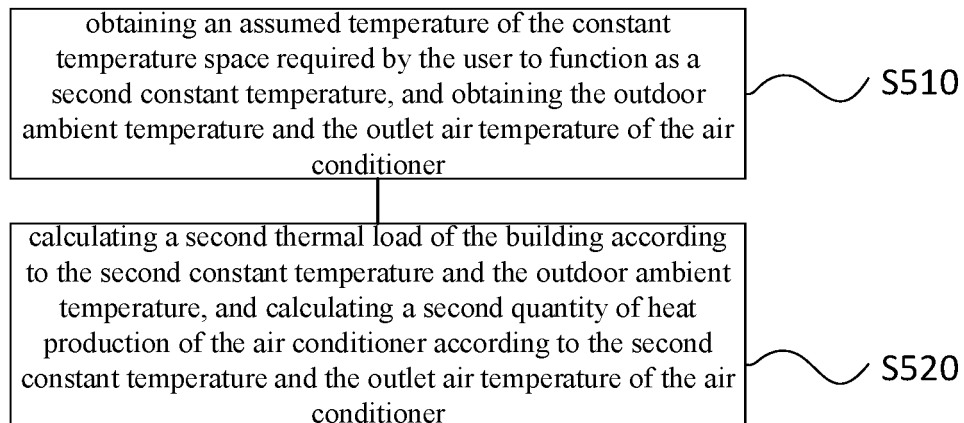


FIG. 5

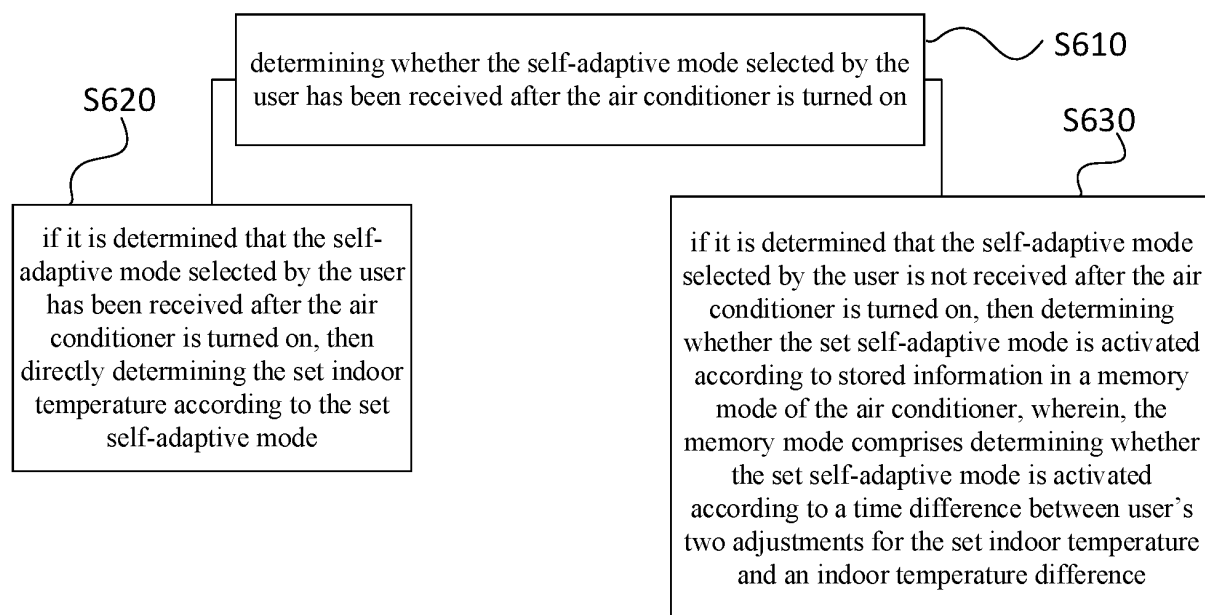


FIG. 6

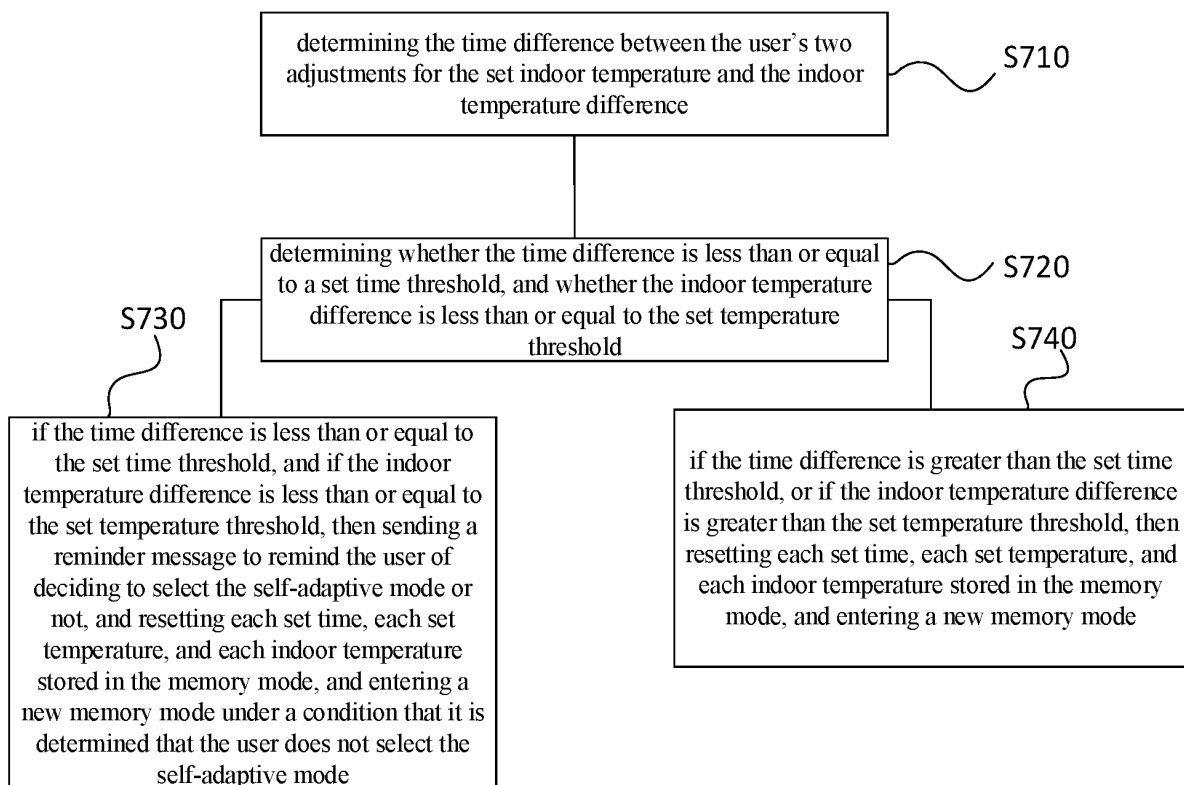


FIG. 7

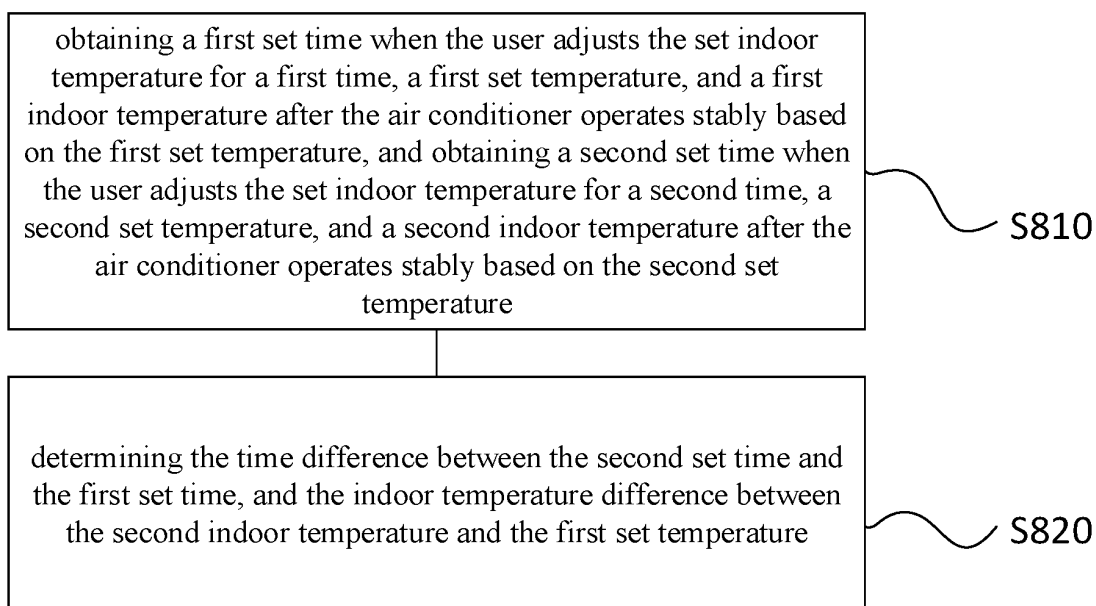


FIG. 8

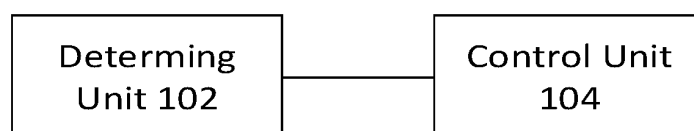


FIG. 9

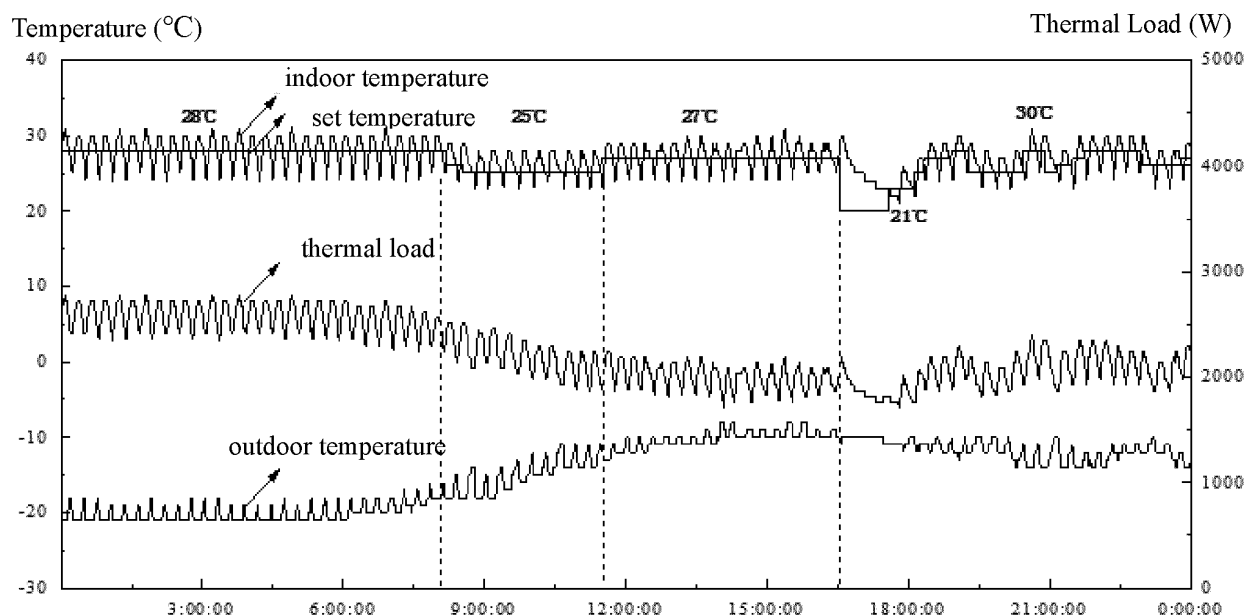


FIG. 10

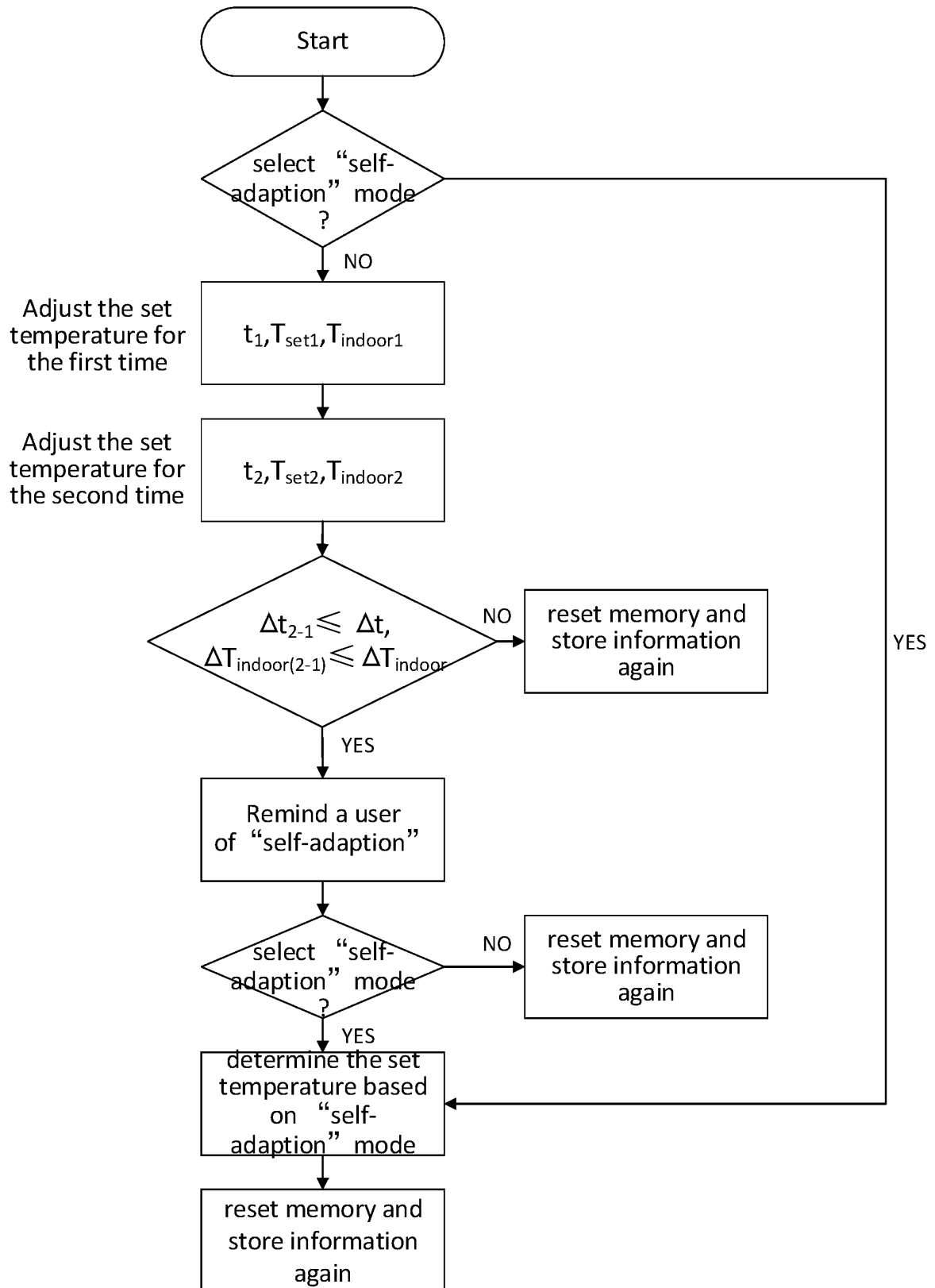


FIG. 11

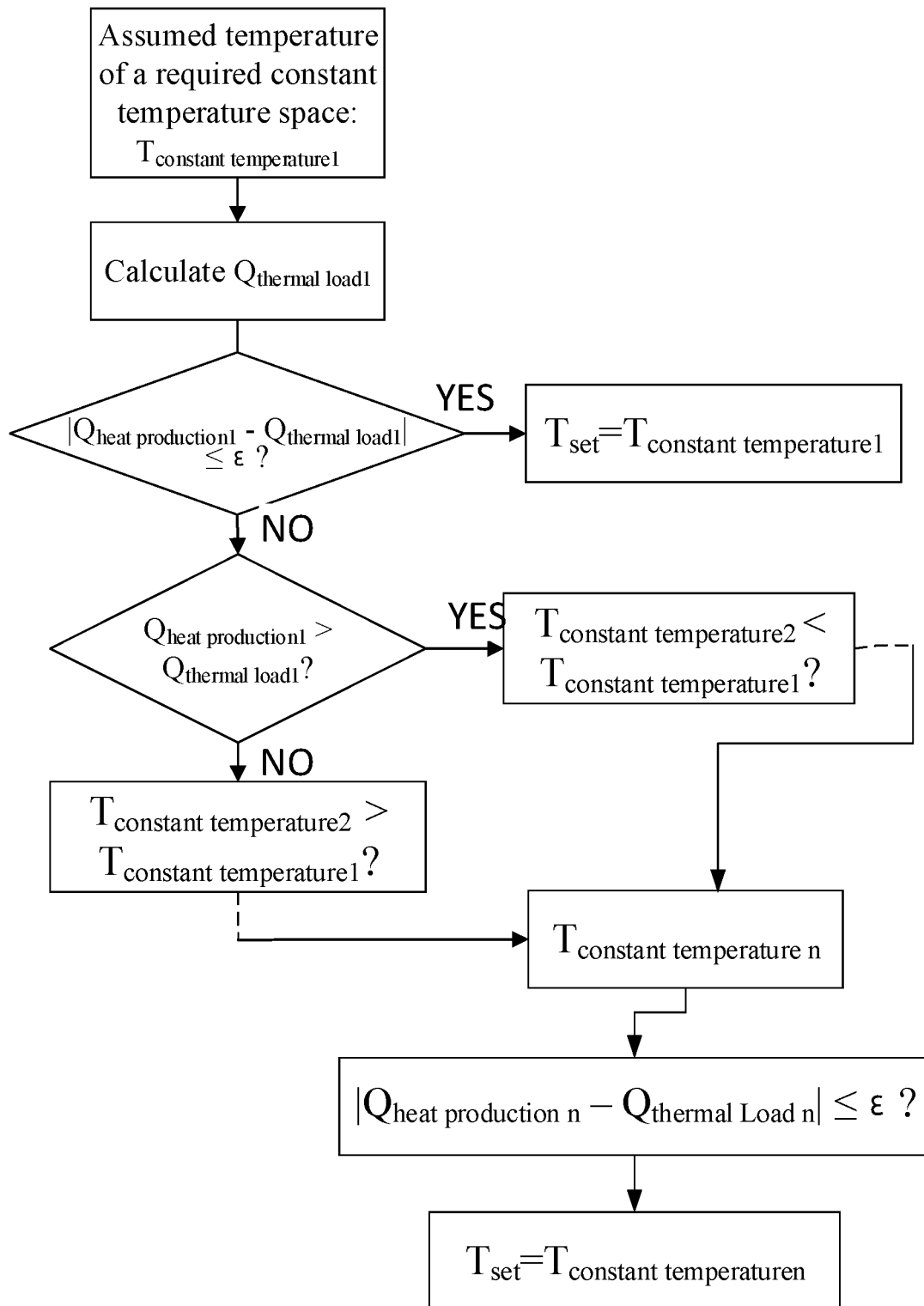


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2019/129761

5	A. CLASSIFICATION OF SUBJECT MATTER	
	F24F 11/64(2018.01)i; F24F 11/61(2018.01)i; F24F 11/65(2018.01)i	
	According to International Patent Classification (IPC) or to both national classification and IPC	
	B. FIELDS SEARCHED	
10	Minimum documentation searched (classification system followed by classification symbols)	
	F24F	
	Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched	
15	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)	
	CNABS, CNTXT, DWPI, SIPOABS, WOTXT, EPTXT, USTXT, PATENTICS: 格力, 室内, 环境, 外界, 温度, 波动, 差值, 设定温度, 目标温度, 调节, 调整, 修正, 补偿, 自动, 自适应, 模式, 制热量, 制冷量, 平衡, 热负荷, 冷负荷, room, indoor, ambient, temperature?, fluctuat+, varia+, setting+, target+, difference?, heat, load, capacit+, adjust+, amend+, correct+, updat+	
	C. DOCUMENTS CONSIDERED TO BE RELEVANT	
20	Category*	Citation of document, with indication, where appropriate, of the relevant passages
	PX	CN 110107994 A (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 09 August 2019 (2019-08-09) claims, description, and figures
25	Y	CN 108679788 A (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 19 October 2018 (2018-10-19) description, paragraphs 4-49
	Y	CN 104913440 A (QINGDAO HAIER AIR CONDITIONER GENERAL CO., LTD.) 16 September 2015 (2015-09-16) description, paragraphs 19-36
30	A	CN 109612034 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD. et al.) 12 April 2019 (2019-04-12) entire document
	A	CN 109323398 A (GD MIDEA AIR-CONDITIONING EQUIPMENT CO., LTD. et al.) 12 February 2019 (2019-02-12) entire document
35		
	☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.	
40	* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	
45	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family	
	Date of the actual completion of the international search	Date of mailing of the international search report
	28 February 2020	13 March 2020
50	Name and mailing address of the ISA/CN	Authorized officer
	China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088 China	
55	Facsimile No. (86-10)62019451	Telephone No.

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A	CN 109210676 A (GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI) 15 January 2019 (2019-01-15) entire document	1-19
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Information on patent family members

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