Title (en)

Method for real-time adjustment of the radial clearance between rotor and stator of a turbo machine.

Title (de)

Regelung, um das Radialspiel zwischen Rotor und Stator einer Turbomaschine dem Istzustand entsprechend anzupassen.

Title (fr)

Procédé d'ajustement en temps réel du jeu radial entre un rotor et un stator de turbomachine.

Publication

EP 0288356 A1 19881026 (FR)

Application

EP 88400883 A 19880413

Priority

FR 8705314 A 19870415

Abstract (en)

[origin: US4849895A] The real-time adjustment system according to the invention utilizes an air flow regulating valve in an air conduit circuit activated by an output signal of an electronic computer. The computer determines a desired radial clearance at an operational time T of the gas turbine engine, which may be stored in the computer memory and may be based on a quantified engine model having the mechanical and thermal features of the rotor and stator elements which are to be controlled as function of engine thermodynamic parameters and the geometry of the elements, with the actual radial clearance computed in operation at the time T by the computer from data sensed in real-time and provided to the computer. The system also senses the maximum admissible stator temperature as well as the maximum temperatures and temperature gradients for the rotor. These limits are considered by the computer prior to emitting the output control signal to the valve. The output signal may also be modified by sensing the effect of the radial clearance by the tapping of the air flow from the compressor, by misalignment of the air between the rotor and stator elements and by the effect of the aerodynamic loses caused by the air tapped from the compressor on the specific consumption of the gas turbine engine.

Abstract (fr)

Le dispositif de commande d'une vanne (16,22) de réglage du débit d'air de ventilation assurant l'ajustement du jeu radial entre un rotor et un stator de turbomachine est actionné en temps réel par le signal de sortie (S1, S2) d'un calculateur électronique (30) qui est élaboré à partir de la comparaison entre, d'une part, un jeu j1 objectif dont la valeur est introduite en mémoire pour des conditions de fonctionnement déterminées de la turbomachine en fonction de ses paramètres thermodynamiques et des caractéristiques géométriques et aérothermiques des pièces et, d'autre part, un jeu j2 calculé à chaque instant à partir des données recueillies et après calcul des températures et des dilatations correspondantes.

IPC 1-7

F01D 11/08

IPC 8 full level

F01D 11/24 (2006.01)

CPC (source: EP US)

F01D 11/24 (2013.01 - EP US)

Citation (search report)

- [X] FR 2508670 A1 19821231 - UNITED TECHNOLOGIES CORP [US]
- [X] GB 2078859 A 19820113 - GEN ELECTRIC
- [Y] FR 2412697 A1 19790720 - UNITED TECHNOLOGIES CORP [US]
- [Y] FR 2540939 A1 19840817 - SNECMA [FR]
- [XP] EP 0231952 A2 19870812 - HITACHI LTD [JP]

Cited by

FR2662469A1; EP1785593A3; EP0481150A1; FR2692936A1; EP3106628A1; EP0424253A1; FR2653171A1; FR2630500A1; DE102009010647A1; FR2971291A1; FR3137119A1; FR2698406A1; EP1795708A3; GB2310255A; US5772400A; GB2310255B; EP2025878A3; US8834108B2; US8936429B2; US11434822B2; US11746702B2

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DOCDB simple family (application)

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