

Title (en)

EFFICIENT ALGORITHM FOR PROCESSING GPS SIGNALS

Title (de)

EFFIZIENTER ALGORITHMUS ZUR VERARBEITUNG VON GPS-SIGNALEN

Title (fr)

ALGORITHME EFFICACE SERVANT A TRAITER DES SIGNAUX DU SYSTEME MONDIAL DE LOCALISATION (GPS)

Publication

EP 1319189 A4 20080820 (EN)

Application

EP 01970107 A 20010913

Priority

- IL 0100865 W 20010913
- US 23342800 P 20000918

Abstract (en)

[origin: WO0223213A2] A disclosed algorithm enables fast and efficient location of a mobile unit by obtaining and processing a snapshot of signals from all satellites in view of a constellation such as the Global Positioning System. The method is capable of dealing with weak signals and requires minimal use of processing time and use of communications resources. Each satellite transmits a signal that consists of a series of frames of a pseudo-noise sequence whereupon is superimposed a satellite data message. The total signal received from the satellite network by the mobile unit is arranged as columns of a matrix and is processed coherently to provide estimated pseudo-ranges and estimated rates of change of pseudo-ranges for in-view satellites. The coherent processing includes performing an initial orthogonal transform on the rows of the matrix and, uses prior knowledge to select that portion of the matrix containing a particular satellite signal for further processing. A reference vector, containing the respective pseudo-noise sequence, is prepared for each satellite in view by cyclically transposing the elements thereof to match the phase of the same sequence in the received signal from the satellite and multiplying the elements of the vector by Doppler compensation factors. Then, for each satellite in view, the columns of the selected matrix portion are convolved with the prepared reference vector for that satellite. Prior knowledge is again used to refine the selection and the satellite data message is demodulated to enable precise location of the start of a pseudo-noise sequence frame and the Doppler shift of the received signal. The process is repeated for at least four satellites in view to determine location and velocity of the receiving station by methods well known in the art.

IPC 8 full level

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CPC (source: EP)

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Citation (search report)

- [E] EP 1143674 A2 20011010 - NOKIA MOBILE PHONES LTD [FI]
- [AD] US 5781156 A 19980714 - KRASNER NORMAN F [US]
- See references of WO 0223213A2

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DOCDB simple family (publication)

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DOCDB simple family (application)

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