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An efficient approach to mitigate scintillation effects on GPS range-finding in ionosphere

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Abstract

This paper presents the optimal approach to mitigate scintillation effects caused by ionosphere irregularities, principally plasma bubbles that occur mostly in ionosphere in low latitude. The mitigation is made by figuring out the scintillation index for the chosen geographic location, extracted from the received real-time RINEX data. Various simulators and programs are used, mainly MATLAB, such as Transionospheric Simulator, Scintillation Index Simulation Program, Power Spectral Density Program, Read RINEX Observation Program and Bubble Scintillation Simulation Program. Based on the detrend signal, MATLAB function that is polyfit will be used to find the phase and amplitude spectra. Comparison simulations result with Bubble Scintillation Simulation Program, which is programmed to detect plasma bubbles in certain geographical area under observations, is executed. The result of this study will provide information for ionospheric

activity and also enable GPS system to make predictions and necessary adjustments to maximize its navigations. ©2008 IEEE.

Author keywords

Global Positioning System (GPS); Ionosphere; Plasma bubble; Scintillation

Indexed keywords

Engineering controlled terms

Computer simulation; Global positioning system; Ionosphere; Ionospheric measurement; Light emission; Luminescence; MATLAB; Plasmas; Satellite navigation aids; Simulators; Technology

Engineering uncontrolled terms

Amplitude spectrum; Communication engineering; Geographic locations; Geographical areas; Global Positioning System (GPS); Human developments; International conferences; Ionospheric activity; Plasma bubble; Plasma bubbles; Power spectral densities; Scintillation effects; Scintillation indices; Simulation programs

Engineering main heading

Scintillation

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