AUTOMATIC RECOGNITION OF TYPE III SOLAR RADIO BURSTS: AUTOMATED RADIO BURST IDENTIFICATION SYSTEM METHOD AND FIRST OBSERVATIONS

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Because of the rapidly increasing role of technology, including complicated electronic systems, spacecraft, etc., modern society has become more vulnerable to a set of extraterrestrial influences (space weather) and requires continuous observation and forecasts of space weather. The major space weather events like solar flares and coronal mass ejections are usually accompanied by solar radio bursts, which can be used for a real-time space weather forecast. Coronal type III radio bursts are produced near the local electron plasma frequency and near its harmonic by fast electrons ejected from the solar active regions and moving through the corona and solar wind. These bursts have dynamic spectra with frequency rapidly falling with time, the typical duration of the coronal burst being about 1–3 s. This paper presents a new method developed to detect coronal type III bursts automatically and its implementation in a new Automated Radio Burst Identification System (ARBIS), which is working in real-time. The central idea of the implementation is to use the Radon transform for more objective detection of the bursts as approximately straight lines in dynamic spectra. Preliminary tests of the method with the use of the spectra obtained during 13 days show that the performance of the current implementation is quite high, ~84%, while no false positives are observed and 23 events not listed previously are found. The first automatically detected coronal type III radio bursts are presented.

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