Texas Tech University - Department of Mathematics and Statistics

Seminar in Applied Mathematics

Studying the efficiency of a method for detecting Gravitational Waves using the Hough Transform

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ABSTRACT. The search of gravitational waves is a very active research field worldwide. Advanced Virgo and LIGO detectors could make to the first direct detection of gravitational waves (GWs) in the next few years opening a new window in the observation of the Universe. A key ingredient in the search of GWs is the development of data analysis (DA) methods able to efficiently dig into the noise to extract these faint signals. In particular, the all-sky search of GWs emitted by spinning neutron stars is particularly interesting from a scientific point of view and challenging from the computational point of view due to the huge parameter space to be explored. In this presentation I'm going to give a summary of the method used by the Virgo group in Rome to detect gravitational waves from these sources, the so called Frequency Hough Transform pipeline. After discussing the procedure I'll give an estimate of the efficiency of the pipeline obtained by analyzing about 1500 signals injected into available LIGO S6 data.