

Application of matched-filtering to analysis of nearly periodic gravitational wave signals

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Basic mathematical concepts of gravitational-wave data analysis will be introduced. In particular statistical principles of detection of signals in noise and estimation of their parameters are presented. Derivation of the matched-filtering statistic for signal consisting of a linear combination of several functions of unknown parameters will be presented. The case of amplitude and frequency modulated signal with application to continuous gravitational wave signals will be discussed in detail.

I shall present codes to for detections and parameter estimation of three types of gravitational wave signals:

1. Monochromatic signal.
2. Signal from r-mode instabilities in a known pulsar.
3. Postmerger signal after binary neutron star merger and ringdown signal after binary black hole merger.

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