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Generalised resampling methodology for binary pulsars

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Rapidly rotating neutron stars with non-axisymmetric deformations are an interesting type of continuous-wave source for the LIGO-Virgo detectors. Within the sensitivity band of these detectors, more than half of the known pulsars in our galaxy are in binary systems. Signals coming from binary sources are Doppler modulated due to the source orbital motion, which spreads the signal in several frequency bins resulting in a significant drop of signal-to-noise ratio, making thus the signal much harder to be detected. In order to correct for this modulation, one would need to know the orbital parameters and source sky location with very high accuracy. For unknown parameters the correction would be very computationally expensive. Directed/Narrowband searches with time domain correction using the generalized 5-vector methodology is a relatively cheaper method, and we investigate its robustness over uncertainty in all orbital parameters.

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