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## Estimation of the Instantaneous Frequency Evolution of Chirping Gravitational Waves from Coalescing Binary Systems via Wigner-Ville Representation

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**Abstract.** The instantaneous frequency evolution of gravitational waves emitted by a coalescing binary system can be retrieved using the Wigner-Ville time-frequency representation [1], via Weinstein uniform asymptotic expansion yielding a (delta-like) Airy function [2–4]. The estimation bias can be evaluated in closed form, and easily removed. The estimated instantaneous-frequency line and the related source chirp-mass estimate are robust against higher-order post-Newtonian corrections, non-ideal (non-Gaussian, non-stationary) noise features and (any) orbital eccentricity [5]. Numerical implementation and computational burden are discussed. A correlation-detector [6] based on Moyal formula [1] is analysed, and its performance-degradation under extreme (1-bit) data compression is evaluated.

**Keywords:** coalescing binary systems, Gravitational wave detection, source parameters estimation, time-frequency representations

### References

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