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REMOVAL OF THE PHASE NOISE IN THE AUTOCORRELATION ESTIMATES WITH DATA WINDOWING (TueAmPO4)

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✶ Abstract :

The sinusoidal frequency estimation from short data records based on Toeplitz autocorrelation matrix estimates suffer from phase noise. This effect becomes prominent especially when additive noise vanishes becoming a nuisance, that is at high signal–to–noise ratios (SNR). Based on both analytic derivation of the AC lag terms and simulation experiments, we show that data windowing can mitigate the limitations caused by the phase noise. Thus with proper windowing, the variance of the frequency estimate is no more limited by phase noise, but it continues to decrease linearly with the SNR. The cases of the Pisarenko frequency estimator and of MUSIC, both for the single sinusoid case, are analyzed in detail.

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