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Asymptotic moving average representation of high-frequency sampled multivariate CARMA processes

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Abstract High-frequency sampled multivariate continuous time autoregressive moving average processes are investigated. We obtain asymptotic expansion for the spectral density of the sampled MCARMA process $(Y_{n\Delta})_{n\in\mathbb{Z}}$ as $\Delta \downarrow 0$, where $(Y_t)_{t\in\mathbb{R}}$ is an MCARMA process. We show that the properly filtered process is a vector moving average process, and determine the asymptotic moving average representation of it, thus generalizing the univariate results to the multivariate model. The determination of the moving average representation of the filtered process, important for the analysis of high-frequency data, is difficult for any fixed positive Δ. However, the results established here provide a useful and insightful approximation when Δ is very small.

Keywords Multivariate continuous time autoregressive moving average (CARMA) process · Spectral density · High-frequency sampling · Discretely sampled process

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