

Invariance Principles for Tempered Fractionally Integrated Processes

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Abstract

We discuss invariance principles for autoregressive tempered fractionally integrated moving averages in α -stable ($1 < \alpha \leq 2$) i.i.d. innovations and related tempered linear processes with vanishing tempering parameter $\lambda \sim \lambda_*/N$. We show that the limit of the partial sums process takes a different form in the weakly tempered ($\lambda_* = 0$), strongly tempered ($\lambda_* = \infty$), and moderately tempered ($0 < \lambda_* < \infty$) cases. These results are used to derive the limit distribution of the OLS estimate of AR(1) unit root with weakly, strongly, and moderately tempered moving average errors.

Keywords: invariance principle; tempered linear process; autoregressive fractionally integrated moving average; tempered fractional stable/Brownian motion; tempered fractional unit root distribution