



## Próximo Seminario DMAT

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Sala de Seminarios, DEPARTAMENTO DE MATEMÁTICA

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### **Semi-parametric factor models for non-stationary time series**

Our previous approach to fitting dynamic non-stationary factor models to multivariate time series is based on the principal components of the time-varying spectral-density matrix. This approach allows the spectral matrix to be smoothly time-varying, which imposes very little structure on the moments of the underlying process. However, the estimation delivers time-varying filters that are high-dimensional and two-sided. Moreover, the estimation of the spectral matrix strongly depends on the chosen bandwidths for smoothing over frequency and time. As an alternative, we introduce a novel semi-parametric approach in which only part of the model is allowed to be time-varying. More precisely, the small-dimensional latent factors admit a dynamic representation with time-varying parameters while the high-dimensional loadings are time-invariant.

In particular, we consider two specifications for the latent factors. In the first model, the latent factors are locally stationary AR processes. The time-varying parameters are approximated by local polynomials and estimated by maximizing the likelihood locally.

In the second model, the volatility of the common latent factors is decomposed into the product of two distinct components. The first component reflects short-run volatility dynamics that we model as factor GARCH processes. The second component captures long-run risks, modeled as an 'evolutionary' (or slowly evolving) function of time.

We provide asymptotic theory, simulation results and applications to real data.