

# Inference in high-dimensional time series models

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# PROPOSITIONS (STELLINGEN)

Accompanying the thesis

## INFERENCE IN HIGH-DIMENSIONAL TIME SERIES MODELS

by

LUCA MARGARITELLA

1. Granger causality captures predictability given a particular information set. While true causality remains a difficult concept to grasp and formalise, if only probabilistically, high-dimensional models are the most appropriate tools to investigate it. (Chapter II)
2. Model selection has long been used as a mere pre-filtering step before performing inference. This, however, disregards the randomness contained in the selection step and leads to malfunctioning asymptotics. (Chapter II)
3. Our restricted lag-augmentation approach is superior to unit root and cointegration pre-testing. The latters are biased as heavily dependent on the exact model specification. (Chapter III)
4. The intentional lag-length overspecification of only the Granger causality variables within the VAR leads to a mostly negligible efficiency loss and allows greater control over the test size. (Chapter III)
5. The alteration of the global temperature has profound impact on human and natural systems. Therefore, in the effort of policymakers in tackling climate change, the assessment of the factors most responsible for igniting the upward global temperature trend is of great relevance. (Chapter IV)
6. Although dense and sparse models are mostly seen as separate worlds, Chapter V shows how they can perfectly co-exist. (Chapter V)
7. The advent of the era of "big data" is one great opportunity to take a stand from oversimplified models and to approach a step higher in the ladder towards a better explanation of the complex reality. (Valorisation)
8. Just as the ability to devise simple but evocative models is the signature of the great scientist, so overelaboration and overparameterization is often the mark of mediocrity. (George E. P. Box, 1976)
9. Any scientific principle which is general to the extent of uniting a whole vast universe of phenomena must be simple: only a principle of the utmost simplicity can dominate a multitude of diverse problems. (Lagrange, 1736-1813)
10. I would rather discover one causal law than be king of Persia. (Democritus, 460-370 B.C)