Causality Inference in a nonstationary and nonhomogenous framework

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The project deploys these statistical and computational techniques to develop a novel approach to causality inference in multivariate time series of economical data on equity and credit risks. The methods build on recent research of project participants, [**?**]. They improve on classical approaches to causality analysis such as Granger causality (see [**?**]) by accommodating general forms of nonstationarity and non-homogeneity. We are interested in clustering of time series based on a minimization of the averaged clustering functional, which describes the mean distance between observation data and its representation in terms of given number of abstract models of a certain predefined class. We are using finite element framework to the problem of time series analysis and to propose a numerical scheme for time series clustering [1].
One of the most challenging component of the numerical solution is Quadratic Programming (QP) problem with the combination of linear equality and bound inequality constraints. In our contribution, we compare tree different QP algorithms to solve this problem - Augmented Lagrangian method combined with active-set strategy [4], Interior-point methods [3] and the modification of Spectral Projected Gradient method for QP [2], [5]. We demonstrate and compare the efficiency of the methods solving practical benchmarks.

References

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