

Research Seminar "Quantitative Economics"

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Abstract

Some Pleasant Sequence-Space Arithmetic in Continuous Time

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Abstract

This paper proposes an analytic representation of sequence-space Jacobians in heterogeneous agent models with aggregate shocks in continuous time. Our approach is based on a pen-and-paper perturbation of individual policy functions with respect to price changes, rather than numerical or automatic differentiation. We obtain linear partial differential equations that can be solved efficiently. Our continuous time algorithm speeds up computation of Jacobians and impulse responses threefold relative to discrete time. Continuous time is key to take the analytic perturbation in the presence of binding borrowing constraints. We illustrate our approach in leading heterogeneous agent models with and without nominal rigidities.