Creating the Ramsey/Cass-Koopmans Model using MATLAB and Simulink

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Many economic and financial models involve systems of differential equations with no analytical solutions. Solving these systems numerically to gain insight into market conditions is a key challenge for economists and other financial professionals.

The fundamental Ramsey/Cass-Koopmans (RCK) model aims to explain long-term economic growth in terms of capital accumulation and consumption growth. The core RCK model is two-dimensional, comprising two ordinary differential equations for per-capita wealth (k) and per-capita consumption (c). The phase portrait of the model is shown in figure 1.

This article presents a complete workflow showing how MATLAB and Simulink can be used to create, solve and visualize the RCK model.

<<Figure 1, phase portrait of the system.>>

**Sections:**

* **Introduction/motivation**
  + This article shows how MATLAB and Simulink ….
* **Creating the model using MATLAB**
  + Should be familiar to the main audience
  + ode45
* **Creating the model using Simulink**
  + More details needed (intro Simulink, block diagrams)
  + More hand-holding
* **Parallelization**
  + Straightforward parfor for both cases
  + Visualization
* **Comparison between the MATLAB and Simulink approaches**
  + Discussion (plus/delta)
    - Feedback loops obvious in Simulink
  + 2x2 summary table
* **Future improvements**
  + (Deployment) Enterprise level/cloud/warehouse – use data analytics words.