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BIOEN 585

20190501

Lab 5: Modeling Stochastic Chemical System

# Question 1: Solve Artyomov model

1. Solved for system four times using the DSDEexact stochastic solver:

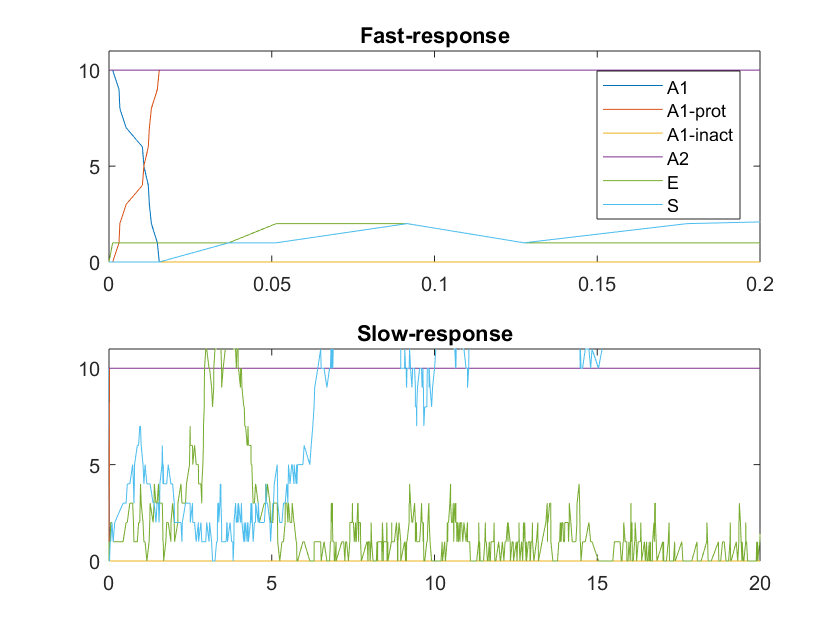
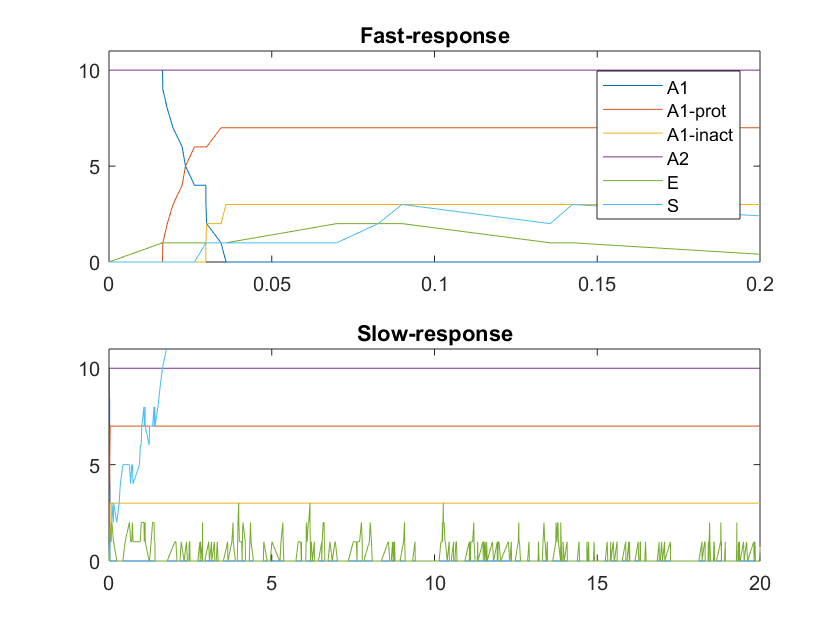
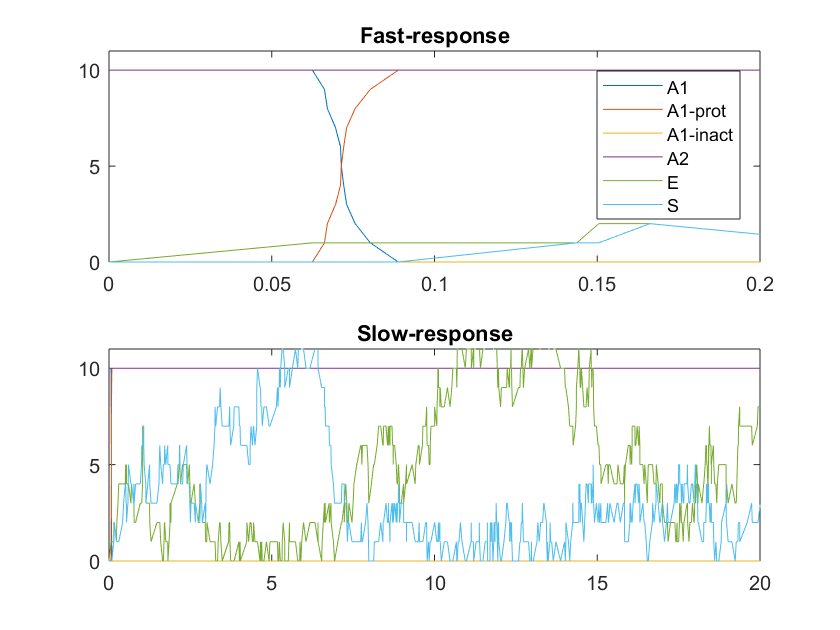
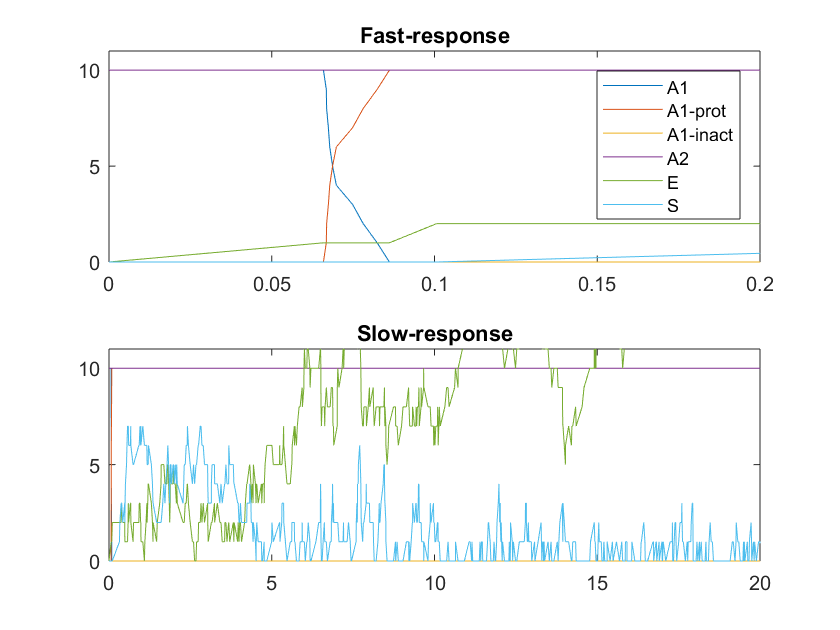


Figure: Plots of four independent runs of the exact stochastic solver given the same initial conditions. The top panel of each plot shows the fast-response (t = 0 to 0.2) and the bottom panel shows the slow-response (t = 0 to 20).

1. Deterministic solution

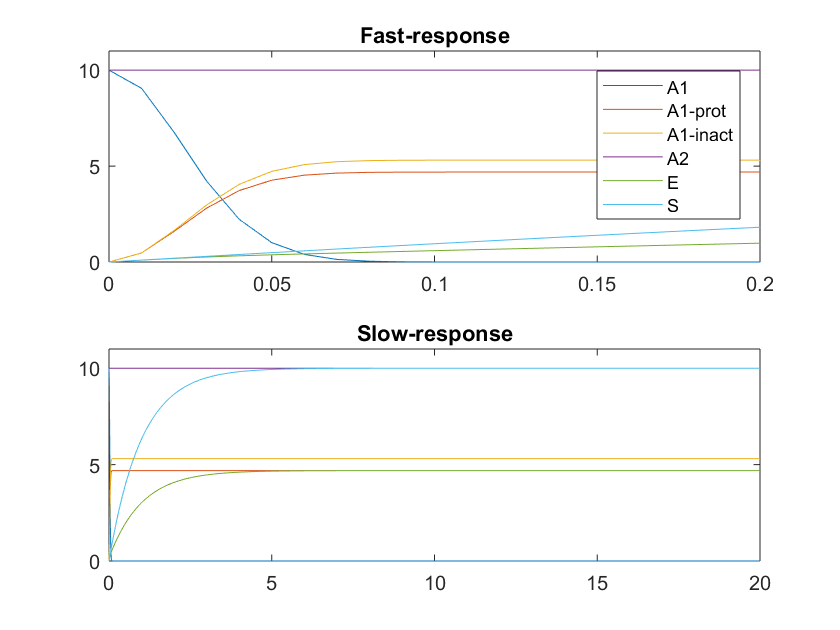


Figure: Shows the deterministic solution to the same system.

1. Relation to conclusions of Artyomov paper

# Question 2: Comparing Efficiency and Accuracy of Solvers

1. Efficiency of tauleap (with relative tolerances of: 0.1, 0.01, 0.001) and exact stochastic solver in relation to initial values of A1, A2

\*note – simulations were run for a time span between [0,1]