

Abstract Submitted
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Spatio-temporal dynamics of a cell signal cascade with negative feedback¹ JOSE LUIS MAYA BERNAL, GUILLERMO RAMIREZ-SANTIAGO, Instituto de Fisica, UNAM — We studied the spatio-temporal dynamics of a system of reactio-diffusion equations that models a cell signal transduction pathway with six cycles and negative feedback. The basic cycle consists of the phosphorylation-dephosphorylation of two antagonistic proteins. We found two regimes of saturation of the enzymatic reaction in the kinetic parameters space and determined the conditions for the signal propagation in the steady state. The trajectories for which transduction occurs are defined in terms of the ratio of the enzymatic activities. We found that in spite of the negative feedback the cell signal cascade behaves as an amplifier and produces phosphoprotein concentration gradients within the cell. This model behaves also as a noise filter and as a switch.

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