

# On Nonlinear Waves in the Space-Temporal Dynamics of the ERK Signaling Protein

Elena Nikolova, Ivan Jordanov, Nikolay K. Vitanov

Institute of Mechanics, Bulgarian Academy of Sciences, Sofia, Bulgaria  
elena@imbm.bas.bg, i\_jordanov@email.bg, vitanov@imbm.bas.bg

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In this paper we model the spatial and temporal dynamics of ERK and STAT protein interaction by means of nonlinear partial differential equations. We show that the diffusion together with the corresponding biochemical reactions is likely to play a critical role in governing the dynamical behavior of the ERK and STAT interaction system. We reduce the above mentioned system to analytically tractable PDE with polynomial nonlinearity up to third order. By applying the modified method of simplest equation to the described model we obtain an analytical solution which describes drop and jump propagation of the ERK protein concentration.