

Exact solutions to kinase activity model

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The spatial distribution of proteins and other substrates regulate cell signalling. We consider a reaction-diffusion model of kinase-receptor activation considered in [1]. The receptors activate the kinase, which may freely diffuse over the entire cell volume. Both kinase and receptors are inactivated by uniformly distributed phosphatase. In this presentation we focus on steady state axially symmetric solutions, which lead to the Steklov eigenproblem [2]. We show the method of finding the exact solution to this problem and some numerical results.

[1] Kaźmierczak B, Lipniacki T; "Regulation of kinase activity by diffusion and feedback", *JTB* 259 (2009) pp. 291-196.

[2] Auchmuty A; "Steklov Eigenproblems and the Representation of Solutions of Elliptic Boundary Value Problems", *Numer. Funct. Anal. Optim.* 25 (2004), pp. 321-348.