

Numerical analysis of a model of tissue invasion and migration of tumor cells

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The goal of the presentation is to describe a new algorithm for the numerical simulations of tumor invasion and metastasis. By means of mathematical model equations (proposed by M. Chaplain, A. Anderson, G. Lolas et al.) and their numerical solutions we investigate how cancer cells can produce and secrete matrix degradative enzymes, degrade extracellular matrix, and invade due to diffusion and haptotactic migration. For the numerical simulations of the interactions between the tumor cells and the surrounding tissue, we apply numerical approximations, which are spectrally accurate and based on small amounts of grid-points. Our numerical experiments illustrate the metastatic ability of tumor cells and the ability of a PDE model to describe prostate cancer development.