Analyses and control for a class of Cahn–Hilliard type phase field systems modelling tumor growth

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A diffuse interface model of tumor growth proposed in [6] has been recently investigated and discussed in [5] and [1] from the viewpoint of existence of solutions, uniqueness and global attractor.

The model consists of a Cahn–Hilliard equation for the tumor cell fraction coupled to a reaction-diffusion equation for a function representing the nutrient rich extracellular water volume fraction.

In particular, if we consider an admissible variant of the system containing two further viscosity terms with small coefficients, it is interesting to see what happens as such coefficents tend to zero: rigorous asymptotic analyses are performed in [2, 3].

On the other hand, a distributed optimal control problem is studied in [4]: the distributed control u plays in the right-hand side of the reaction-diffusion equation and it can be interpreted as a nutrient supply or a medication, while the cost functional aims to keep the tumor cell fraction under control during the evolution.

The talk will try to make an overview of the related results.

References

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