

# Diffuse interface models of tumor growth: optimal control and other issues

**Elisabetta Rocca**

(elisabetta.rocca@unipv.it)

(*Università di Pavia, Italy*)

We will present some results on optimal control problems for a diffuse interface model of tumor growth. The state equations couple a Cahn-Hilliard equation and a reaction-diffusion equation, which models the growth of a tumor in the presence of a nutrient and surrounded by host tissue. The introduction of cytotoxic drugs into the system serves to eliminate the tumor cells and in this setting the concentration of the cytotoxic drugs will act as the control variable. Furthermore, we will also allow the objective functional to depend on a free time variable, which represents the unknown treatment time to be optimized. As a result, we obtain first order necessary optimality conditions. Other issues, like the existence of solutions to more complex models, including the velocity field, for example, will be discussed.