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Mathematical Modeling of Brain Cancer Growth Using a Level-Set Method

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Title: Mathematical Modeling of Brain Cancer Growth Using a Level-Set Method

Glioblastoma multiforme (GBM) is one of the fastest-growing brain tumors and it has very low survival rates. Mathematical modeling can be used to predict the growth and treatment of brain cancer. However, one of the difficulties lies in the ability to estimate patient-specific parameters in the mathematical model from magnetic resonance imaging (MRI) data. In this poster, I will present a methodology that we developed based on a Level-Set method that solves the reaction-diffusion equation with randomly assigned parameters values on a brain geometry derived from MRI. Using information about the size of the different glioma sub-regions, we are developing a method that estimates the patient-specific model parameters so that we can predict the overall survival of a patient from a single pre-operative scan.