Dear Reviewers of Journal of Mathematical Biosciences and Engineering

 Due to imprecise, incomplete or missing data and natural variability of the tumor-immune system (TIS) emerges between different individuals, the kinetic parameters of TIS model are uncertain that this uncertainty can be captured by fuzzy sets.

 We assign fuzzy numbers with triangular membership functions instead of crisp values to some kinetic parameters of the TIS model.

In fact, the uncertainty in the kinetic parameters of the ordinary differential equation (ODE) model of TIS affects the dynamic of the tumor and immune cells.

In this study, for the first time, a fuzzy number has been used to model the uncertainty of the parameters of an ODE model of TIS.

Our data reveals that increasing/decreasing the uncertainty band of the model's fuzzy parameters increases/decreases the uncertainty band of cell’s dynamics.

The simulations of the model in both crisp and fuzzy settings, showed the repetition of 5-FU treatment for inhibition of MDSCs, eradicate tumor cells.

By fuzzification of parameters, the uncertainty of the cell’s dynamics affected by the uncertainty of the parameters was calculated. Also, we investigate the effect of perturbation of model parameters on cell’s dynamics through assigning probability density functions to parameters and performing global sensitivity analysis (partial rank correlation coefficient test and elementary effects test).

Best Regards

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