Mathematical Methods and Models in Biosciences
June 18-23, 2023, Pomorie, Bulgaria
https://biomath.math.bas.bg/biomath/index.php/bmcs

State constraints optimal control problems applied to ebola epidemic model

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Optimal control is a powerful tool that provide useful information in order to combat the progression of a disease by testing and comparing different vaccination strategies. In this talk, I will emphasize on vaccination of susceptibles individuals as control function, as well as on the number of available vaccines as state contraints to a Ebola model. In this direction, state constraints on the number of available vaccines can be studied after considering an appropriate cost functional to 8-dimensional nonlinear differential equations modeling the dynamics transmission of Ebola disease. Further, we analyze an optimal control problem where there is limitation on the supply of vaccines either in a fixed period of time or at each instant of time. The optimal control problem is solved analytically by maximum principle of Pontryagin type. Finally, a number of numerical simulations is performed in order to validate the analytical result.

Acknowledgements F.N. is supported by the Bulgarian Ministry of Education and Science, Scientific Programme "Enhancing the Research Capacity in Mathematical Sciences (PIKOM)", No. DO1-67/05.05.2022.