

Game theory and dual approach to the dynamic programming on the example of the COVID-19 pandemic in Poland described by mathematical model with three-dose vaccinated

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In this paper new approach to the disease transmission dynamic of COVID-19 pandemic is presented, involving the use of game theory and dual dynamic programming. New compartment model which describes this dynamic is presented. New classes to this model were added which takes into account part of the population vaccinated only with one dose, two doses or three doses. Pandemic costs are also included. Parameters (strategies) which depend on time are used. These strategies allow consider different variants of behavior and decisions made by the policymakers. Sufficient conditions for dual ε -closed-loop Nash equilibrium in the form of a verification theorem are formulated. Numerical algorithm and numerical simulations are constructed. Comparison between real pandemic data for Poland and data obtained from the model are made.

References

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