1106-VG-500 **Ellina Grigorieva*** (egrigorieva@twu.edu), 1200 Frame Street, MCL423, math department, Denton, TX 76204, and **Evgenii Khailov**. *Epidemic Modeling and Control.*

The term control is in wide use in the mathematical epidemiology. It is usually assumed that the spread of epidemics is stopped if the basic reproduction ratio is less than 1. There are some papers in which an epidemic control means finding such parameters or initial conditions of the model at which the number of suspected individuals is reduced (for example, by imposing total vaccination) or if the transmission rate becomes very small (washing hands, isolating sick people, closing public events). This approach is very attractive by its simplicity. Unfortunately, there is no proof that such control policy is optimal or even unique. In this paper, for a SIR model with varying population size, we solve an optimal control problem associated with vaccination, treatment and a proper usage of indirect epidemiological measures. Our goal is to find such optimal policy that would minimize the number of the infected individuals at the terminal time. We considered such values of the model' parameters (1947 New York smallpox epidemic), for which the optimal controls, defined from the maximum principle, are bang-bang, with no singular arcs. Estimating the number of switchings of these controls is related to the estimation of the number of zeros of the corresponding switching functions. (Received August 31, 2014)