

Mathematical Statistics Stockholm University Bachelor Thesis **2023:2** http://www.math.su.se

An analysis of stochastic epidemic modeling with a time-varying contact rate.

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June 2023

Abstract

This thesis aims to analyze how interventions affect an epidemic. To do this, we will consider two stochastic general epidemic models, one with a constant rate of infection (i.e., no interventions) and one with a time-varying contact rate corresponding to the interventions implemented. More precisely, we studied numerical calculations and simulations for each model's reproduction number, final size and looked into the concept of flattening the curve. Then, we also studied the optimal timing for reducing the contact rate in the SIR epidemic model with interventions to minimize the outbreak and stretch the epidemic, which is known as the time of intervention.

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