COVID-19の数理モデル解析

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概要

本報告ではCOVID-19に焦点をあてて，感染症流行予測と制御のための感染症数理モデルの基礎的利用法とその問題点を報告する。はじめに基本再生産数の推定と緊急事態宣言の効果に関する最近の研究を紹介する。ついで，無症候性感染モデルによって，社会距離拡大政策のもとでの発症者隔離の効果を，状態別再生産数の概念を用いて考察する。ついで大量検査と隔離の効果をとりいれたモデルによって，実効再生産数による介入効果の定量化をおこなう。最後に無症候性感染規模の推定問題を考える。

Mathematical model analysis for COVID-19

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Abstract

In this talk, we focus on COVID-19 to discuss elementary applications and problems of mathematical model for infectious diseases for prediction and control of the epidemic. First, we introduce recent results for the estimate of the basic reproduction number and examine the effect of declaration of the state of emergency. Next, based on the asymptomatic transmission model and the state-reproduction number, we consider the effect of quarantine of symptomatic infecteds under the social distancing policy. Subsequently we construct a mathematical model to quantify the effect of massive testing and quarantine by using the effective reproduction number. Finally, we consider an estimation problem for the size of unobserved asymptomatic infecteds.

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