
JUNLING MA, University of Victoria

Detecting the change of the exponential growth rate during an early stage of an epidemic

The exponential growth rate is a key indicator of transmission intensity during the early stages of an epidemic and is closely linked to the basic reproduction number through the serial interval. Changes in control measures, transmission patterns, or the emergence of new variants can alter this rate, making rapid and reliable detection of such shifts essential for informing public health responses. We first derive proper likelihood functions and then employ a hidden Markov model (HMM) to robustly estimate the exponential growth rate. Based on the model, we develop new statistical tools for real-time detection of changes in this rate. We retrospectively apply our framework to the early phase of the COVID-19 pandemic in BC, Canada, demonstrating both the effectiveness and the limitations of our approach.