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An SIR Contact Tracing Model for Randomly Mixed Populations

Contact tracing is an important intervention measure to control infectious diseases. We present a new approach that borrows the edge dynamics idea from network models to track contacts included in a compartmental SIR model for an epidemic spreading in a randomly mixed population. Unlike network models, our approach does not require statistical information of the contact network, data that are usually not readily available. The model resulting from this new approach allows us to study the effect of contact tracing and isolation of diagnosed patients on the control reproduction number and number of infected individuals. We estimate the effects of tracing coverage and capacity on the effectiveness of contact tracing. Our approach can be extended to more realistic models that incorporate latent and asymptomatic compartments.