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Epidemic compartmental models: Realizations for Covid-19 and the bearing of vaccination scenarios

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Our work is aimed at analyzing the intrinsic variability of epidemic compartmental models, including the main qualitative characteristics of the Covid-19 pandemic, such as a relatively long asymptomatic contagious incubation period and a time-limited immunity. Intrinsic variability is important in order to quantitatively distinguish it from extrinsic variation factors, such as variability of virulence, social behavior, weather and climate, or statistical interpretation of data. The influence of vaccination rates is also analyzed, in as far as different scenarios may avert or revert the existence of an asymptotic endemic equilibrium point, as well as contribute to the build-up of herd immunity.