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Abstract: The interplay of seasonality, the system's nonlinearities and intrinsic stochasticity, is studied for a seasonally forced susceptible-exposed-infective-recovered stochastic model. The model is explored in the parameter region that corresponds to childhood infectious diseases such as measles. The power spectrum of the stochastic fluctuations around the attractors of the deterministic system that describes the model in the thermodynamic limit is computed analytically and validated by stochastic simulations for large system sizes. Size effects are studied through additional simulations. Other effects such as switching between coexisting attractors induced by stochasticity often mentioned in the literature as playing an important role in the dynamics of childhood infectious diseases are also investigated. The main conclusion is that stochastic amplification, rather than these effects, is the key ingredient to understand the observed incidence patterns.

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