

# A Discrete SIS Model of Epidemic for Heterogeneous Population without Discretization of its Continuous Counterpart

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We propose a model of an infectious disease transmission in a heterogeneous population consisting of two different subpopulations: individuals with low and high susceptibility to an infection. This is a discrete model which was built without discretization of its continuous counterpart. We investigate conditions for existence and local stability of stationary states. We compute the basic reproduction number  $\mathcal{R}_0$  of the given system, which determines the local stability of the disease-free stationary state. Additionally, we consider a situation when there is no illness transmission in the subpopulation with the low susceptibility. Theoretical results are complemented with numerical simulations.

## References

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- [2] M. Martcheva, *An Introduction to Mathematical Epidemiology*, Texts in Applied Mathematics 61, 450 p. (2015)

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