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Maia Martcheva (maia@ufl.edu), 358 Little Hall, PO Box 118105, Gainesville, FL 32611. *Two strain SIS model with diffusion.*

In this work, we consider a two-strain SIS model with diffusion and coefficients depending on space. One way to understand the role of spatial effects in epidemiology is to consider models with diffusion. Spatial dependence of the coefficients is necessary to account for transmissibility, recovery and other epidemiological characteristics that vary with location. We introduce the basic reproduction number, and invasion numbers for the SIS model and study the properties of the disease-free equilibrium and endemic equilibria. We show that although in the corresponding space-independent SIS model the two strains will exclude each other, niche-partitioning mechanisms in the diffusion model may allow for coexistence of the strains. Our two strain model is based on the single strain SIS model considered in L. J. S. Allen, B. M. Bolker, Y. You, A.L. Nevai, Asymptotic profiles of the steady states for an SIS epidemic reaction-diffusion model, *Discrete and Continuous Dynamical Systems*, 21, (2008) 1-20. (Received August 25, 2009)