COMPARTMENTAL-MULTI-PATCH MODELING AND SIMULATION OF ZIKA-VIRUS SPREAD

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The Zika Virus is a mosquito borne flavivirus which was found to cause Gullian-Barré syndrome. In addition the disease is transmitted directly from infected human to susceptibles. To model the disease spread we make certain assumptions on the parameters and divide the area of interest into multiple patches. The main idea of multi-patch modeling is to incorporate the fact that a population of a region is diverse, be it humans or mosquitoes. By this multi-patch approach we are also able to consider the evolution of the disease due to human mobility. The basis is an SIR-UV model in every patch. We analyze the model with respect to the non-negativity of the feasible region, behaviour of reproduction number with different choices of parameters, existence of equilibria and stability. By a heuristic limit procedure we obtain a system of PDEs which involves a cross diffusion between the compartments. For the latter finite elements and finite differences will be used for numerical simulations.