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Exploring a Parasite-Host Model with Monte Carlo Simulations NYLES BREECHER, JIAJIA DONG, Hamline University — We explore parasite-host interactions, a less investigated subset of the well-established predator-prey model. In particular, it is not well known how the numerous parameters of the system affect its characteristics. Parasite-host systems rely on their spatial interaction, as a parasite must make physical contact with the host to reproduce. Using C++ to program a Monte Carlo simulation, we study how the speed and type of movement of the host affect the spatial and temporal distribution of the parasites. By drawing on mean-field theoretics, we find the exact solution for the parasite distribution with a stationary host at the center and analyze the distributions for a moving host. The findings of the study provide rich behavior of a non-equilibrium system and bring insights to pest-control and, on a larger scale, epidemics spreading.

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