

Modelling a plantation-nursery system

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A plantation is subject to insect-borne infections; infected trees are cut down and replaced by seedlings from an adjacent nursery. Unfortunately, some of these seedlings are also infected. The number of infected trees $X(t)$ in the plantation can be represented by a Markov chain in continuous time. We derive a set of Kolmogorov equations for the probabilities of $X(t)$, and solve these using Laplace transforms. The main result is that it takes a very long time for the process to reach its stationary state.