

Spectral analysis of a population model

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We study a closed one-sex population migrating between “states” which may be correspond to geographical regions, social status, physiological features or other classifications. We assume that the demographic processes (ageing, births and deaths) occur on a much slower time scale than migrations. The existence of different time scales in the model is accounted for by introducing a small parameter $\varepsilon > 0$ describing the relative strength of these processes; thus the system becomes singularly perturbed.

The main result of the work is to find an explicit expression of the dominant spectral value of the generator of the semigroup for the system.