1044-92-69 **Horst R Thieme*** (`thieme@math.asu.edu`), Department of Mathematics and Statistics, Arizona State University, Tempe, AZ 85287-1804. *Spectral bound and reproduction number for infinite dimensional population structure and time heterogeneity.*

Spectral bounds of quasi-positive matrices are crucial mathematical threshold parameters in population models that are formulated as systems of ordinary differential equations: the sign of the spectral bound of the variational matrix at 0 decides about whether, at low density, the population becomes extinct or grows.

Another important threshold parameter is the reproduction number $\mathcal{R}$ which is the spectral radius of a related positive matrix. As it is well-known, the spectral bound and $\mathcal{R}-1$ have the same sign provided that the matrices have a particular form.

The relation between spectral bound and reproduction number extends to models with infinite dimensional state space and then holds between the spectral bound of a resolvent-positive closed linear operator and the spectral radius of a positive bounded linear operator. We also extend an analogous relation between the spectral radii of two positive linear operators which is relevant for discrete-time models.

We illustrate the general theory by applying it to an epidemic model with distributed susceptibility, population models with age structure, and, using evolution semigroups, to time heterogeneous population models. (Received August 18, 2008)