962-92-923   **Mimmo Iannelli** (`iannelli@alpha.science.unitn.it`), Dipartimento di Matematica, Universita di Trento 38050 Povo(Trento), Italy, and **Maia Martcheva*** (`mayam@duke.poly.edu`), Department of Mathematics, Polytechnic University, Six MetroTech Center, Brooklyn, NY 11201.
Homogeneous dynamical systems and the age-structured SIR model with proportionate mixing.

We consider an age-structured SIR model with force of infection of proportionate mixing type. The reulting age-structured model has variable total population size, population reproductive number different from one, and exhibits exponential solutions with nonzero growth rate. In order to analyze this model we first extend known results on homogeneous systems from the ODE case to the PDE case showing that an exponential solution is locally stable if all eigenvalues of the linearized operator have real parts smaller than the growth rate of the population. We show that the age-structured SIR model has two equilibrium exponential solutions - one corresponding to a disease-free state, and another - corresponding to an endemic state. The disease-free one is locally stable if the reproductive number of the disease is smaller than one; the endemic one is locally stable if the reproductive number of the disease is greater than one and additional hypothesis is satisfied. (Received September 29, 2000)