



Figure 1: The schematic representation of the *SEIR* metapopulation model. In the compartment diagram, inhabitants of a particular city or location are represented by a particular color. The square boxes represent the set of individuals who are in the Susceptible, Exposed, Infectious, and Recovered class. The downward arrows represent the flow from one compartment to another within a city or population and are annotated with the corresponding flow rates. The arrow pointing to the right between the square boxes represents the flow between the corresponding compartments of another city or population and is annotated with the emigration rate. The dashed circles represent immigrants in a particular city, for example,  $j$ , who emigrated from another city, for example,  $i$ . The dashed arrow represents the return of immigrants to the home city and is annotated with the return rate. The outward and inward arrows from and to the square boxes represent death and birth, annotated with the respective death and birth numbers, assuming the same birth and death rates.