Let 90% residents of i commute back and forth to their workplace at j. Residents start travelling from i between t_1 and t_2, and arrive at j between t_{c1} and t_{c2}. Let $T_{ij}(t)$ be a commuter pulse that is non-zero between t_1 and t_2 that satisfies

$$\int_{t_1}^{t_2} T_{ij}\ dt = 0.9 N_i(t_1)$$

where $N_i(t)$ is the population of node i at time t. The transport is then

$$\begin{aligned}\dot{S}_i &= \dots - \frac{S_i(t)}{N_i(t)} T_{ij} \\ \dot{I}_i &= \dots - \frac{I_i(t)}{N_i(t)} T_{ij}. \\ \dot{R}_i &= \dots - \frac{R_i(t)}{N_i(t)} T_{ij}\end{aligned}$$

where ... refers to the standard SIR terms. The total number of people leaving i between t_1 and t_2 is then

$$-\int_{t_1}^{t_2} \left(\dot{S}_i + \dot{I}_i + \dot{R}_i\right) dt = \int_{t_1}^{t_2} T_{ij} dt = 0.9 N_i(t_1)$$

If we disallow $I(t)$ to leave home, we get

$$\begin{aligned}\dot{S}_i &= \dots - \frac{S_i(t)}{N_i(t)} T_{ij} \\ \dot{I}_i &= \dots \qquad\qquad . \\ \dot{R}_i &= \dots - \frac{R_i(t)}{N_i(t)} T_{ij}\end{aligned}$$

and the total number of people leaving is

$$0.9 N_i(t_1) - \int_{t_1}^{t_2} \dot{I}_i dt \quad (1)$$

which is in general a difficult integral to compute, but we are guaranted that (1) has a lower and upper bound of 0 and $0.9 N_i(t_1)$ respectively.