Network Definition

Consider the digraph, $G = (V, E)$. Set of all nodes, V and the set of all edges is given by $E = E_r \cup E_h \cup E_s$. Here, E_r, E_h and E_s are the set of on-ramp, highway and off-ramp links. For node v denote the sets of incoming and outgoing links with $\Gamma^-(v) = \{(i,j) : v = j \ \forall (i,j) \in E\}$ and $\Gamma^+(v) = \{(i,j) : v = i \ \forall (i,j) \in E\}$ respectively. For link $e = (i,j)$ denote the sets of incoming and outgoing links with $\mathcal{I}(i,j) = \Gamma^-(i)$ and $\mathcal{O}(i,j) = \Gamma^+(j)$ respectively. Let, $M = \bigcup_{v \in V} M_v$ where the set of moves for a node, v is $M_v = \Gamma^-(v) \times \Gamma^+(v)$.