

$$\delta_{i,j} := \text{If}[i == j, 1, 0];$$

$$\mathbf{gR}_{s,i,j} := \left\{ \mathbf{g}_{v_i\beta} \Rightarrow \delta_{i\beta} + T_v^s \mathbf{g}_{vi^+\beta} + (1 - T_v^s) \mathbf{g}_{vj^+\beta}, \right.$$

$$\mathbf{g}_{v_j\beta} \Rightarrow \delta_{j\beta} + \mathbf{g}_{vj^+\beta}, \mathbf{g}_{v_\alpha i} \Rightarrow T_v^{-s} (\mathbf{g}_{v\alpha i^+} - \delta_{\alpha i^+}),$$

$$\left. \mathbf{g}_{v_\alpha j} \Rightarrow \mathbf{g}_{v\alpha j^+} - (1 - T_v^s) \mathbf{g}_{v\alpha i} - \delta_{\alpha j^+} \right\}$$