

$$\text{TG}_{i_,j_}[\mathcal{E}_] := \mathcal{E} / \cdot \{$$

$$\mathbf{v}_{k_} \Rightarrow \mathbf{v}_k + \delta_{k,j} \left((\mathbf{t}_i - \mathbf{1}) (\mathbf{v}_j - \mathbf{v}_i) + \mathbf{v}_{i,j} - \mathbf{v}_{i,i} \right) + \delta_{k,i} (\mathbf{u}_j - \mathbf{u}_i) \mathbf{u}_i \mathbf{w}_j,$$

$$\mathbf{v}_{L_,k_} \Rightarrow \mathbf{v}_{L,k} + (\mathbf{t}_i - \mathbf{1}) \times \left(\delta_{k,j} (\mathbf{v}_{L,j} - \mathbf{v}_{L,i}) + (\delta_{L,i} - \delta_{L,j} \mathbf{t}_i^{-1} \mathbf{t}_j) (\mathbf{u}_k + \delta_{k,j} (\mathbf{t}_i - \mathbf{1}) (\mathbf{u}_j - \mathbf{u}_i)) \mathbf{u}_i \mathbf{w}_j \right),$$

$$\mathbf{u}_{k_} \Rightarrow \mathbf{u}_k + \delta_{k,j} (\mathbf{t}_i - \mathbf{1}) (\mathbf{u}_j - \mathbf{u}_i),$$

$$\mathbf{w}_{k_} \Rightarrow \mathbf{w}_k + (\delta_{k,j} - \delta_{k,i}) (\mathbf{t}_i^{-1} - \mathbf{1}) \mathbf{w}_j \} // \text{Expand}$$