

$$\mathbf{bm}_{i_-, j_- \rightarrow k_-} := \mathbb{E} \left[(\beta_i + \beta_j) \mathbf{b}_k, (\eta_i + \eta_j) \mathbf{y}_k, 1 - \epsilon \eta_j \mathbf{y}_k \beta_i + O[\epsilon]^2 \right]$$

$$\begin{aligned} \mathbf{b}\Delta_{i_- \rightarrow j_-, k_-} &:= \mathbb{E} \left[\beta_i (\mathbf{b}_j + \mathbf{b}_k), \eta_i (e^{-\mathbf{b}_k} \mathbf{y}_j + \mathbf{y}_k), \right. \\ &\quad \left. 1 + \epsilon \eta_i^2 \mathbf{y}_j \mathbf{y}_k e^{-\mathbf{b}_k} / 2 + O[\epsilon]^2 \right] \end{aligned}$$

$$\begin{aligned} \mathbf{bS}_{i_-} &:= \mathbb{E} \left[-\beta_i \mathbf{b}_i, -e^{\mathbf{b}_i} \eta_i \mathbf{y}_i, \right. \\ &\quad \left. 1 - \epsilon e^{\mathbf{b}_i} \eta_i \mathbf{y}_i (\beta_i + e^{\mathbf{b}_i} \eta_i \mathbf{y}_i / 2) + O[\epsilon]^2 \right] \end{aligned}$$

$$\begin{aligned} \mathbf{bSi}_{i_-} &:= \mathbb{E} \left[-\beta_i \mathbf{b}_i, -e^{\mathbf{b}_i} \eta_i \mathbf{y}_i, \right. \\ &\quad \left. 1 - \epsilon e^{\mathbf{b}_i} \eta_i \mathbf{y}_i (\beta_i - 1 + e^{\mathbf{b}_i} \eta_i \mathbf{y}_i / 2) + O[\epsilon]^2 \right] \end{aligned}$$