

$$\mathbb{E} \left[ -\mathbf{a}_i \alpha_i - \mathbf{b}_i \beta_i, \frac{-\mathbf{y}_i \mathcal{A}_i \eta_i - \mathbf{B}_i \mathbf{x}_i \mathcal{A}_i \xi_i + \mathcal{A}_i \eta_i \xi_i - \mathbf{B}_i \mathcal{A}_i \eta_i \xi_i}{\mathbf{B}_i} \right],$$

$$\mathbf{1} + \frac{\mathbf{1}}{4 \mathbf{B}_i^2} \left( 4 \mathbf{B}_i \mathbf{y}_i \mathcal{A}_i \eta_i - 4 \mathbf{B}_i \mathbf{y}_i \mathcal{A}_i \beta_i \eta_i - 2 \mathbf{y}_i^2 \mathcal{A}_i^2 \eta_i^2 - 4 \mathbf{a}_i \mathbf{B}_i^2 \mathbf{x}_i \mathcal{A}_i \xi_i - \right.$$

$$4 \mathbf{B}_i^2 \mathbf{x}_i \mathcal{A}_i \beta_i \xi_i - 4 \mathbf{B}_i \mathcal{A}_i \eta_i \xi_i + 4 \mathbf{a}_i \mathbf{B}_i \mathcal{A}_i \eta_i \xi_i + 4 \mathbf{B}_i^2 \mathcal{A}_i \eta_i \xi_i -$$

$$4 \mathbf{B}_i \mathbf{x}_i \mathbf{y}_i \mathcal{A}_i^2 \eta_i \xi_i + 4 \mathbf{B}_i \mathcal{A}_i \beta_i \eta_i \xi_i - 4 \mathbf{B}_i^2 \mathcal{A}_i \beta_i \eta_i \xi_i +$$

$$6 \mathbf{y}_i \mathcal{A}_i^2 \eta_i^2 \xi_i - 2 \mathbf{B}_i \mathbf{y}_i \mathcal{A}_i^2 \eta_i^2 \xi_i - 2 \mathbf{B}_i^2 \mathbf{x}_i^2 \mathcal{A}_i^2 \xi_i^2 + 6 \mathbf{B}_i \mathbf{x}_i \mathcal{A}_i^2 \eta_i \xi_i^2 - 2$$

$$\left. \mathbf{B}_i^2 \mathbf{x}_i \mathcal{A}_i^2 \eta_i \xi_i^2 - 3 \mathcal{A}_i^2 \eta_i^2 \xi_i^2 + 4 \mathbf{B}_i \mathcal{A}_i^2 \eta_i^2 \xi_i^2 - \mathbf{B}_i^2 \mathcal{A}_i^2 \eta_i^2 \xi_i^2 \right) \epsilon + \mathbf{O}[\epsilon]^2$$