$$\left(a_k \left(\alpha_i + \alpha_j \right) + y_k \left(\eta_i + e^{-\alpha_i} \eta_j \right) + \right.$$
$$b_k \left(\beta_i + \beta_j + \eta_j \xi_i \right) + x_k \left(e^{-\alpha_j} \xi_i + \xi_j \right) \right) +$$
$$\left(a_k \eta_j \xi_i - \frac{1}{2} b_k \eta_j^2 \xi_i^2 - e^{-\alpha_i} y_k \eta_j \left(\beta_i + \eta_j \xi_i \right) - \right.$$
$$\left. e^{-\alpha_j} x_k \xi_i \left(\beta_j + \eta_j \xi_i \right) \right) \epsilon + O[\epsilon]^2$$