$$\Delta J = \Delta J(x^*(t), \delta x(t)) = \int_{t_0}^{t_f} [\frac{\partial V(x^*(t), \dot{x}^*(t), t)}{\partial x} \delta x(t)$$
$$+ \frac{\partial V(x^*(t), \dot{x}^*(t), t)}{\partial \dot{x}} \delta \dot{x}(t) + \frac{1}{2!} \{ \frac{\partial^2 V(\ldots)}{\partial x^2} (\delta x(t))^2 + \frac{\partial^2 V(\ldots)}{\partial \dot{x}^2} (\delta \dot{x}(t))^2 + 2 \frac{\partial^2 V(\ldots)}{\partial x \partial \dot{x}} \delta x \delta \dot{x} \} + \cdots] dt$$