$$my'' + q\mathbf{E}_0 = 0 \text{ subject to } \quad y(0) = 0, \;\; y'(0) = U_0$$

$$t_0 \sim \frac{mU_0}{qE_0}, \;\; y_0 \sim \frac{mU_0^2}{qE_0}$$

$$\frac{y_0}{L} \sim \frac{mU_0^2}{qE_0 L} \equiv \mathbb{E}\mathrm{u}_e \equiv \frac{\text{inertia}}{\text{electrostatic force}}$$

$$\min\ \chi^2 = \sum_{i=1}^{n} \frac{\left(yO(x)_i - yX(x)_i\right)^2}{yX(x)_i}$$

where $yX(x)$ is a solution of $my'' = \frac{1}{2}\rho C_D A_d^2 y'^2 + \rho_f \mathbf{E}(y) + \frac{1}{2}\left|\mathbf{E}(y)\right|^2 \nabla\epsilon$

$$\text{given}\ \ x = \begin{cases} V_d \\ \sigma \end{cases} \quad \text{subject to}\ \ g = \begin{cases} V_d \pm u_{exp} \\ \sigma \pm u_{exp} \\ y_0 \pm u_{exp} \\ t_0 \pm u_{exp} \end{cases}$$