$$\Delta E_{natural} = \text{natural\_deterioration\_step}(t, \Delta t, \mu_A, \sigma_A, \mu_B, \sigma_B, \mu_w, \sigma_w, \lambda, \alpha, \beta)$$

$$E_{t+\Delta t} = E_t + \Delta E_{natural}, \text{ if } a_t == 0$$
$$E_{t+\Delta t} = E_t * 1.2, \text{ if } a_t == 1$$
$$E_{t+\Delta t} = E_0 \text{ if } a_t == 2$$

$$K_{t+\Delta t} = \text{assemble\_K}(E_{t+\Delta t}, A_{t+\Delta t}, L_e, N)$$

$$M_{t+\Delta t} = \text{assemble\_M}(\ \rho_{t+\Delta t}, A_{t+\Delta_t}, L_e, N)$$

Static Analysis:
$$U_{t+\Delta t} = \text{Static\_solve}\ (K_{t+\Delta t}, F)$$

Dynamic Analysis:
$$acc_{t+\Delta t} = \text{Dynamic\_solve}\ (K_{t+\Delta t}, M_{t+\Delta t}, F_{t+\Delta t})$$

Static Analysis:
$O_{t+\Delta t} = (U_{t+\Delta t} + noise)$ [mid_point]

DSF = DamageSensitiveFeature(acceleration time series data)

$$a_{t+\Delta t} = f(o_{0:t+\Delta t}) = \text{NN}\ (o_{0:t+\Delta t})$$

$$r_{t+\Delta t} = f(a_{t+\Delta t}, o_{0:t+\Delta t})$$
NN is trained to optimize the total weighted reward $R_t^\pi = \sum_{i=t}^{T} \gamma^{i-t} r(o_i, a_i, o_{i+1})$