Dynamic loading

Q

$$\min_{A(x)} \int_0^T \int_0^L p(x,t)\, u(x,t)\, dx$$

Subject to

$$h(x,t): \quad (EAu')' + p(x,t) + \rho A(x)\ddot{u} + b\dot{u} = 0$$

$EA'u' + EAu''$

$b\dot{u}$ → Damping

$$\Delta \qquad \int_0^L A\, dx - V^* \leq 0$$

Data: E, $p(x,t)$, ρ, b, V^*, L, T

$$\delta_u L = 0$$

$$P - (hEA')' - \dot{h}b + (hEA)'' + (\ddot{h}\rho A) = 0$$

$$P - (hEA')' - \dot{h}b + (hEA)'' + \ddot{h}\rho A = 0$$

$$P + (h'EA)' - b\dot{h} + \ddot{h}\rho A = 0 \qquad \text{Adjoint Eq}$$

$\dot{h}$

So in order match adjoint eq^n with Gov eq^n then integrating G.E $\int_\tau^0$ $\boxed{\tau = -T}$

It's like if we discretize wrt to time then we will have

Adjt 1 Adjt 2 — — — — Adjt 10

So those adjoint equations need to solved in reverse order.