MECH 6325 HW 1

10)

$$S_x(w) = \frac{6w^2+12}{(w^2+4)(w^2+1)}$$

$$= \frac{6(w^2+2)}{(w^2+4)(w^2+1)}$$

$$E[X^2] = \text{Var}(X) = \frac{1}{2\pi}\int_{-\infty}^{\infty} S_x(w)\,dw$$

$$= \frac{1}{2\pi}\int_{-\infty}^{\infty} \frac{6(w^2+2)}{(w^2+4)(w^2+1)}\,dw \to 4\pi$$

$$\boxed{E[x^2] = 2}$$

$$E[X] = A[x(t)] = \lim_{w\to 0} S_x(w) = \frac{12}{4}$$

$$\boxed{E[x] = 3}$$