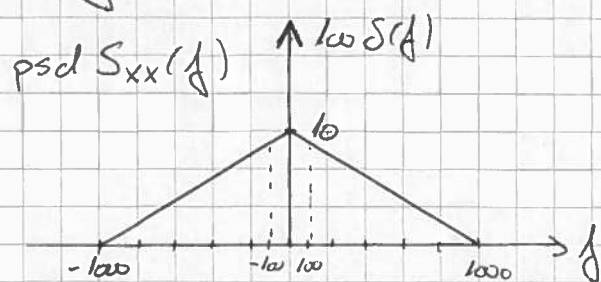


Opq. 3.20



$$S_{xx}(f) = \begin{cases} \frac{1}{100}(f+100) + 100\delta(f) & -100 \leq f \leq 0 \\ -\frac{1}{100}(f-100) + 100\delta(f) & 0 \leq f \leq 100 \\ 0 & \text{elsewhere} \end{cases}$$

a) $P_x(\text{DC}) = \int_0^\infty S_{xx}(f) df = 100 \text{ W}$

b) $E(x^2(t)) = R_{xx}(0) = \int_{-\infty}^{\infty} S_{xx}(f) df = \frac{1}{2} \cdot 100 \cdot 10 + 100 + \frac{1}{2} \cdot 100 \cdot 10$
 $= 10100 \text{ W} = P_x$

c) $P_x(0, 100 \text{ Hz}) = \int_{-100}^{100} S_{xx}(f) df = 2 \cdot \int_0^{100} S_{xx}(f) df = 2 \cdot \left(\frac{10+0}{2} \cdot 100 + \frac{1}{2} \cdot 100 \right)$
 $= 1900 + 100 = \underline{\underline{2000 \text{ W}}}$