

3^e méthode : Domaine fréquentiel

$$S_y(f) = \text{TF}(c_y(z)) = \text{TF}(c_x(z) * h(z) * h^*(-z)) \\ = S_x(f) \cdot H(f) \cdot H^*(f) = S_x(f) \cdot |H(f)|^2$$

$$H(f) = \text{TF}(h(z)) = \text{TF}(\delta(z) + a \delta(z - T_0)) \\ = 1 + a e^{-2\pi j f T_0} = 1 + a \cos 2\pi f_0 T_0 + j a \sin 2\pi f_0 T_0$$

$$|H(f)|^2 = (1 + a \cos 2\pi f_0 T_0)^2 + a^2 \sin^2 2\pi f_0 T_0 \\ = 1 + 2a \cos 2\pi f_0 T_0 + \underbrace{a^2 \cos^2 2\pi f_0 T_0}_{a^2} + \underbrace{a^2 \sin^2 2\pi f_0 T_0}_{a^2} \\ = 1 + a^2 + 2a \cos 2\pi f_0 T_0$$

$$S_y(f) = \frac{c^2}{4} (\delta(f + f_0) + \delta(f - f_0)) \cdot (1 + a^2 + 2a \cos 2\pi f_0 T_0)$$