Solution #1

L'impulsion $\delta(t-2)$ est en dehors des bornes d'intégration et ne contribue pas à l'intégrale. On a donc

$$\int_4^\infty \underbrace{10\cos(\pi t/2)\,\text{sinc}(t/4)}_{f(t)}\,\delta(t-\underset{\uparrow t_0}{6})\,dt = f(t_0) = f(6)$$

et

$$f(6) = 10\cos(3\pi)\,\text{sinc}(1.5)$$

$$= 10(-1)\,\frac{\sin(3\pi/2)}{3\pi/2} = \frac{20}{3\pi} \approx 2.122066$$

Solution #2

La période est $T = 0.1$ ms. On a

$$P_s = \frac{1}{T}\int_T |s(t)|^2\,dt$$

$$= \frac{1}{0.1E\text{-}3}\int_0^{5E\text{-}5} 25\,dt \quad V^2$$

$$= \frac{25 \times 5E\text{-}5}{0.1E\text{-}3} = 12.5\,V^2$$

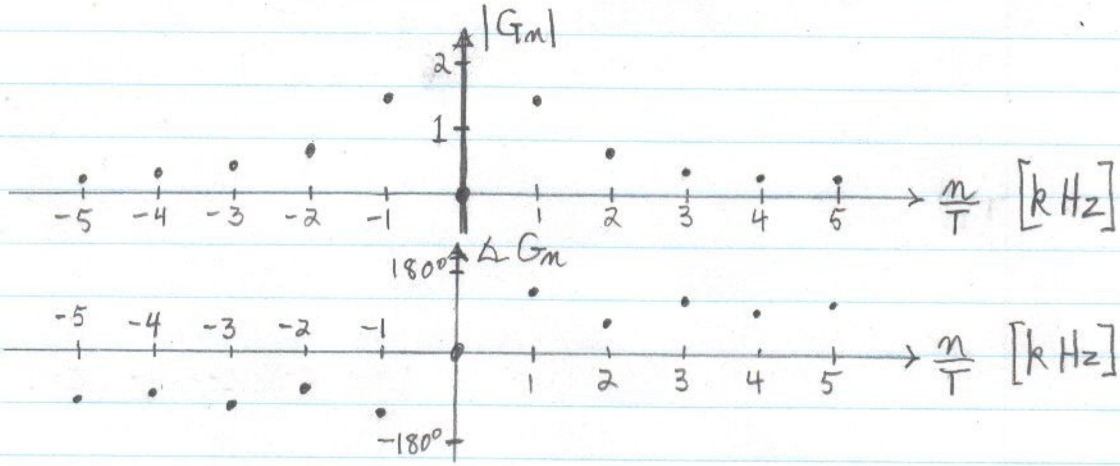
Dans $50\,\Omega$ on a 0.25 W $= 23.9794$ dBm.

Solution #3

(a)

n	0	1	2	3
G_n	0	$1.4866\angle 137.7^\circ$	$0.57064\angle 61.19^\circ$	$0.3550\angle 110.1^\circ$
G_{-n}	0	$1.4866\angle -137.7^\circ$	$0.57064\angle -61.19^\circ$	$0.3550\angle -110.1^\circ$

n	4	5
G_n	$0.2593\angle 74.62^\circ$	$0.2048\angle 102.4^\circ$
G_{-n}	$0.2593\angle -74.62^\circ$	$0.2048\angle -102.4^\circ$



(b) $\frac{11}{12} P_g \approx 5.416666$

$$|G_0|^2 + 2|G_1|^2 + 2|G_2|^2 + 2|G_3|^2 + 2|G_4|^2 + 2|G_5|^2$$

$\underbrace{|G_0|^2}_{0}$

$\underbrace{|G_0|^2 + 2|G_1|^2}_{4.419959 < \frac{11}{12}P_g}$

$\underbrace{|G_0|^2 + 2|G_1|^2 + 2|G_2|^2}_{5.071219 < \frac{11}{12}P_g}$

$\underbrace{|G_0|^2 + 2|G_1|^2 + 2|G_2|^2 + 2|G_3|^2}_{5.323269 < \frac{11}{12}P_g}$

$\underbrace{|G_0|^2 + 2|G_1|^2 + 2|G_2|^2 + 2|G_3|^2 + 2|G_4|^2}_{5.45772 > \frac{11}{12}P_g}$

La largeur de bande est donc 4 kHz.

(c) On obtient facilement

n	0	1	2	3	4	5
C_n	0	2.9732	1.14128	0.71	0.5186	0.4096
θ_n	0°	137.7°	61.19°	110.1°	74.62°	102.4°