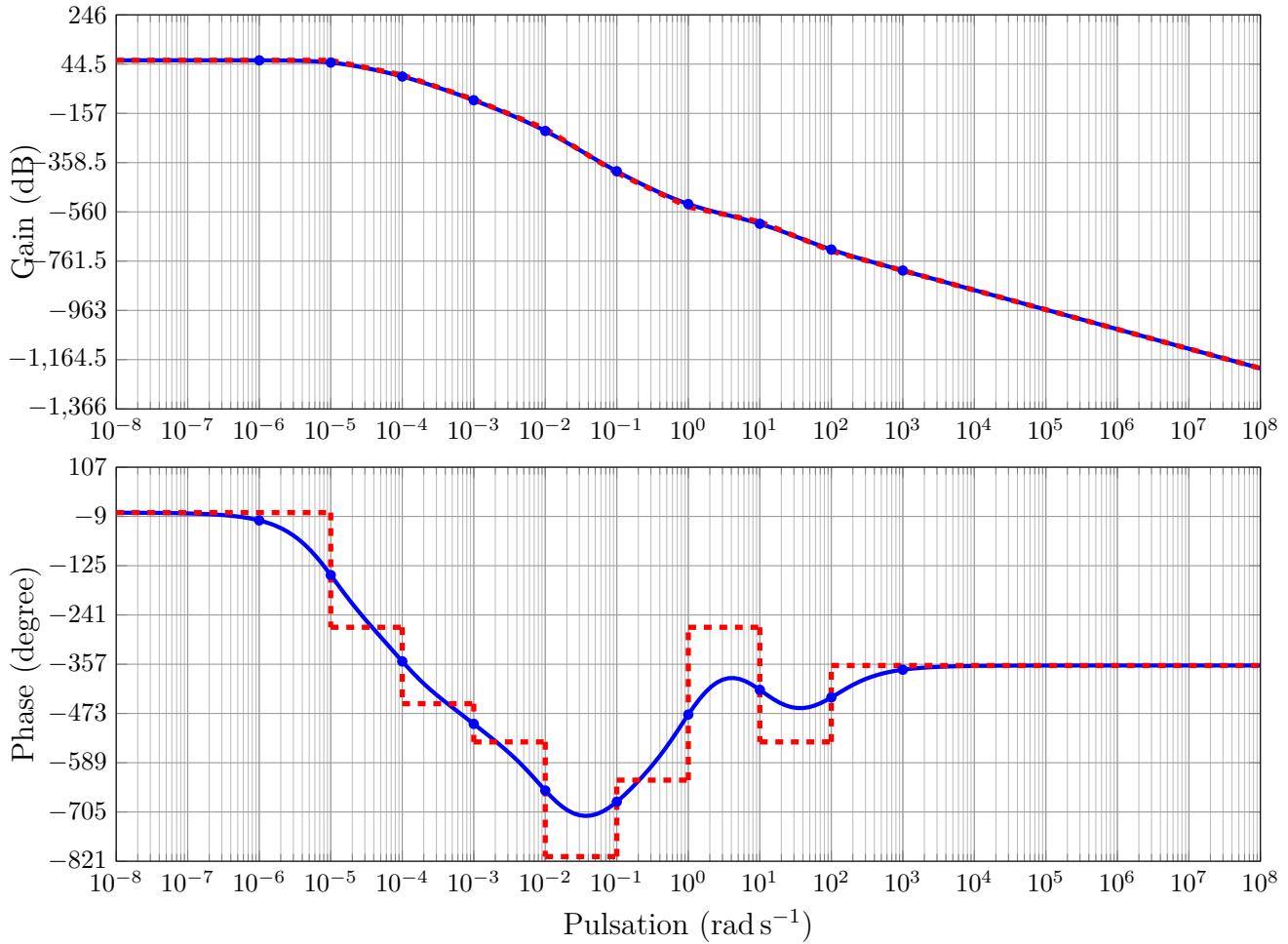


$$H(p) = \frac{1000(10p+1)^2(p+1)^4(0.01p+1)^2}{(1000000p+1)^3(10000p+1)^2(1000p+1)(100p+1)^3(0.1p+1)^3}$$



### Fonctions réelles du gain et du déphasage

$$G(\omega) = |H(j\omega)| = \frac{1000 (1 + \tau_5^2 \omega^2) (1 + \tau_6^2 \omega^2)^2 (1 + \tau_8^2 \omega^2)}{(1 + \tau_1^2 \omega^2)^{\frac{3}{2}} (1 + \tau_2^2 \omega^2) \sqrt{1 + \tau_3^2 \omega^2} (1 + \tau_4^2 \omega^2)^{\frac{3}{2}} (1 + \tau_7^2 \omega^2)^{\frac{3}{2}}}$$

$$G_{dB}(\omega) = 60 - 30 \log(1 + \tau_1^2 \omega^2) - 20 \log(1 + \tau_2^2 \omega^2) - 10 \log(1 + \tau_3^2 \omega^2) - 30 \log(1 + \tau_4^2 \omega^2) + 20 \log(1 + \tau_5^2 \omega^2) + 40 \log(1 + \tau_6^2 \omega^2) - 30 \log(1 + \tau_7^2 \omega^2) - 30 \log(1 + \tau_8^2 \omega^2)$$

$$\phi(\omega) = \arg H(j\omega) = -3 \arctan \tau_1 \omega - 2 \arctan \tau_2 \omega - \arctan \tau_3 \omega - 3 \arctan \tau_4 \omega + 2 \arctan \tau_5 \omega + 4 \arctan \tau_6 \omega - 3 \arctan \tau_7 \omega + 2 \arctan \tau_8 \omega$$

### Quelques valeurs particulières (calculées) :

Pulsation (rad s⁻¹)	$10^{-6}$	$10^{-5}$	$10^{-4}$	$10^{-3}$	$10^{-2}$	$10^{-1}$	$10^0$	$10^1$	$10^2$	$10^3$
Gain (dB)	60	51	-6	-103	-229	-394	-528	-609	-714	-800
Déphasage (°)	-18	-147	-350	-498	-654	-681	-476	-417	-435	-370

Commande pour reproduire ce fichier :

```
./bodePGFtikz -a -s 100000 -3 -s 10000 -2 -s 1000 -1 -s 100 -3 -s 10 2 -s 1 4 -s 0.1 -3 -s 0.01 2 -g 1000
```