Chevauchement des fonctions d'aiguillage usuelles en audio

$fc := 1\ kHz$ $f := 100\ Hz, 101\ Hz .. 10\ kHz$

Butterworth d'ordre 1 :

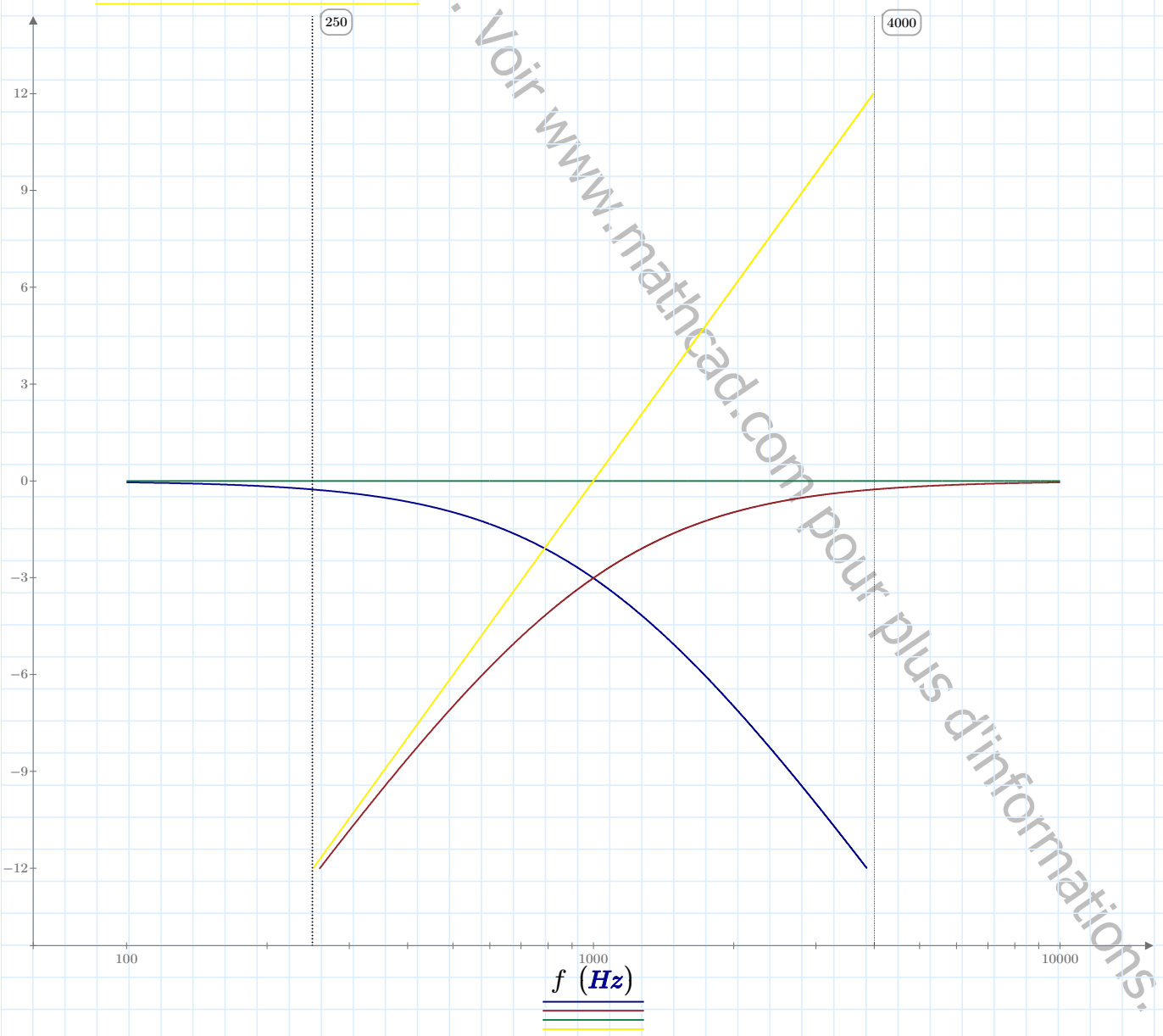
$$But1_{Low}(f) := \frac{1}{1 + 1j \cdot \frac{f}{fc}} \qquad But1_{High}(f) := \frac{1j \cdot \frac{f}{fc}}{1 + 1j \cdot \frac{f}{fc}}$$

$20 \cdot \log\left(\left|But1_{Low}(f)\right|\right)$

$20 \cdot \log\left(\left|But1_{High}(f)\right|\right)$

$20 \cdot \log\left(\left|But1_{High}(f) + But1_{Low}(f)\right|\right)$

$20 \cdot \log\left(\left|\frac{But1_{High}(f)}{But1_{Low}(f)}\right|\right)$



Linkwitz-Riley d'ordre 2 :

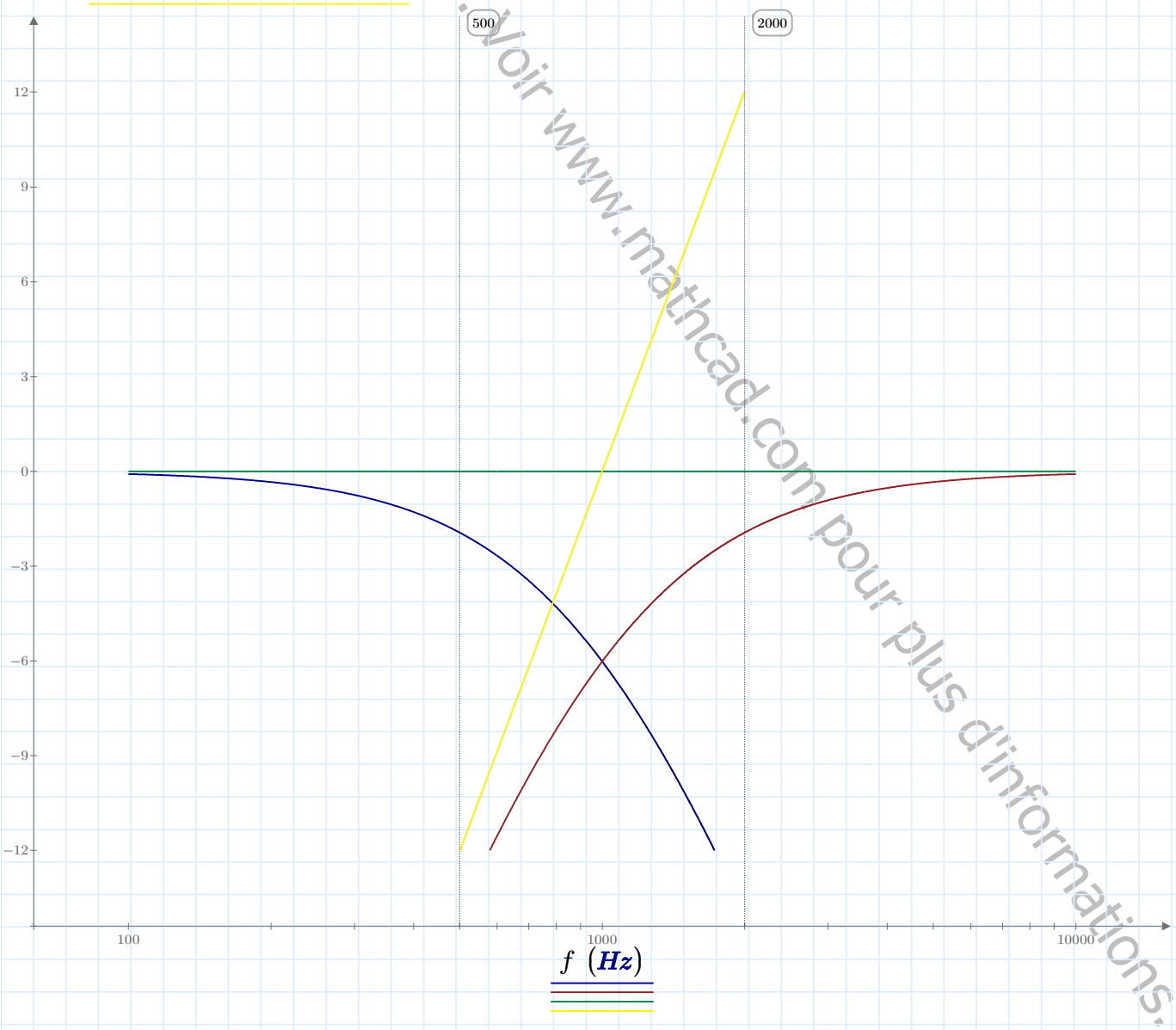
$$LR2_{Low}(f) := \frac{1}{1 + 2j \cdot \frac{f}{fc} - \left(\frac{f}{fc}\right)^2} \qquad LR2_{High}(f) := \frac{-\left(\frac{f}{fc}\right)^2}{1 + 2j \cdot \frac{f}{fc} - \left(\frac{f}{fc}\right)^2}$$

$20 \cdot \log\left(\left|LR2_{Low}(f)\right|\right)$

$20 \cdot \log\left(\left|LR2_{High}(f)\right|\right)$

$20 \cdot \log\left(\left|LR2_{High}(f) - LR2_{Low}(f)\right|\right)$

$20 \cdot \log\left(\left|\frac{LR2_{High}(f)}{LR2_{Low}(f)}\right|\right)$



Butterworth d'ordre 3 :

$$But3_{Low}(f) := \frac{1}{1+1j\cdot\frac{f}{fc}} \cdot \frac{1}{1+1j\cdot\frac{f}{fc}-\left(\frac{f}{fc}\right)^2}$$

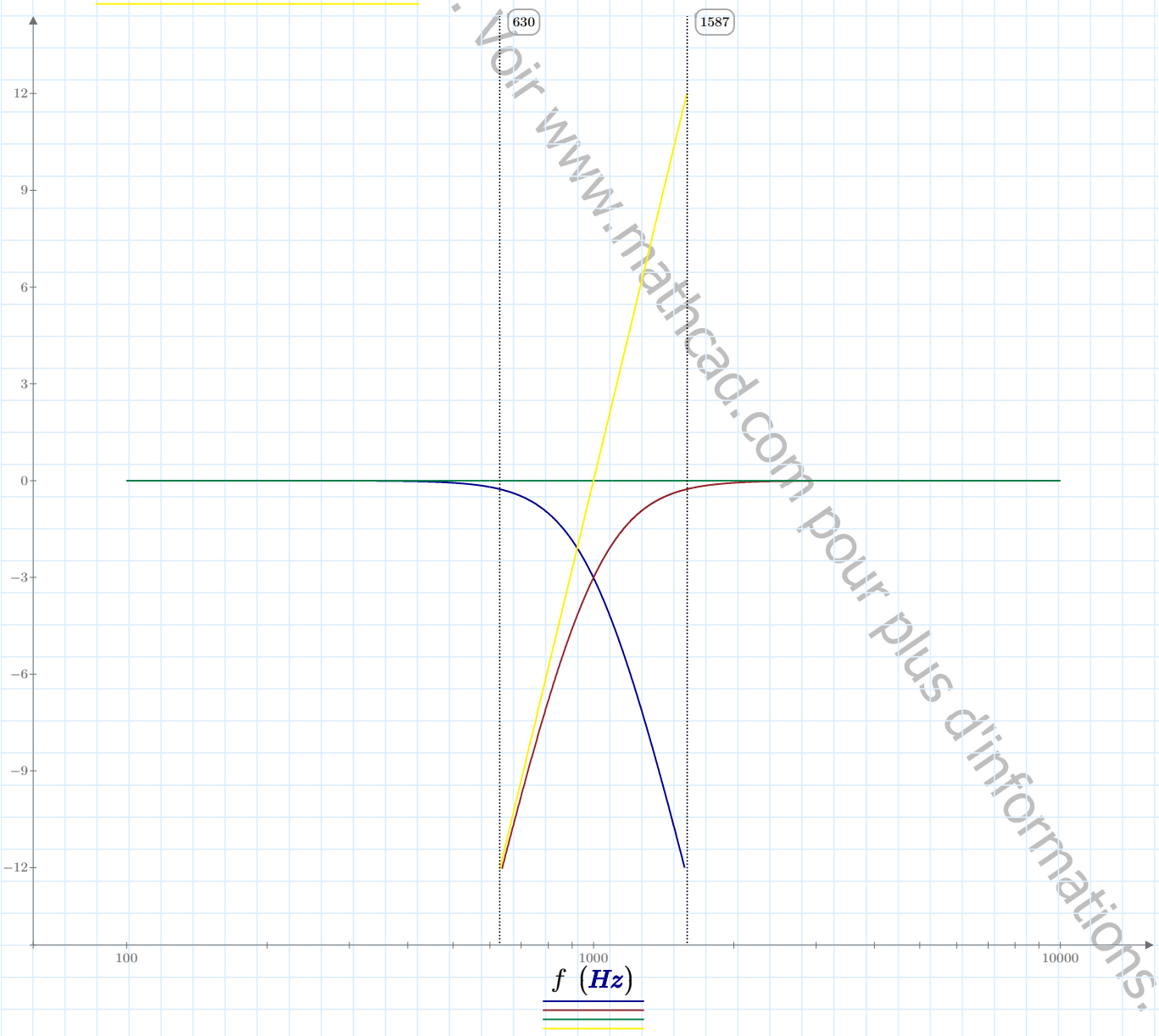
$$But3_{High}(f) := \frac{1j\cdot\frac{f}{fc}}{1+1j\cdot\frac{f}{fc}} \cdot \frac{-\left(\frac{f}{fc}\right)^2}{1+1j\cdot\frac{f}{fc}-\left(\frac{f}{fc}\right)^2}$$

$20\cdot\log\left(\left|But3_{Low}(f)\right|\right)$

$20\cdot\log\left(\left|But3_{High}(f)\right|\right)$

$20\cdot\log\left(\left|But3_{High}(f)-But3_{Low}(f)\right|\right)$

$20\cdot\log\left(\left|\frac{But3_{High}(f)}{But3_{Low}(f)}\right|\right)$



Linkwitz-Riley d'ordre 4 :

$$LR4_{Low}(f) := \left(\frac{1}{1 + \sqrt{2} \cdot 1j \cdot \frac{f}{fc} - \left(\frac{f}{fc}\right)^2} \right)^2$$

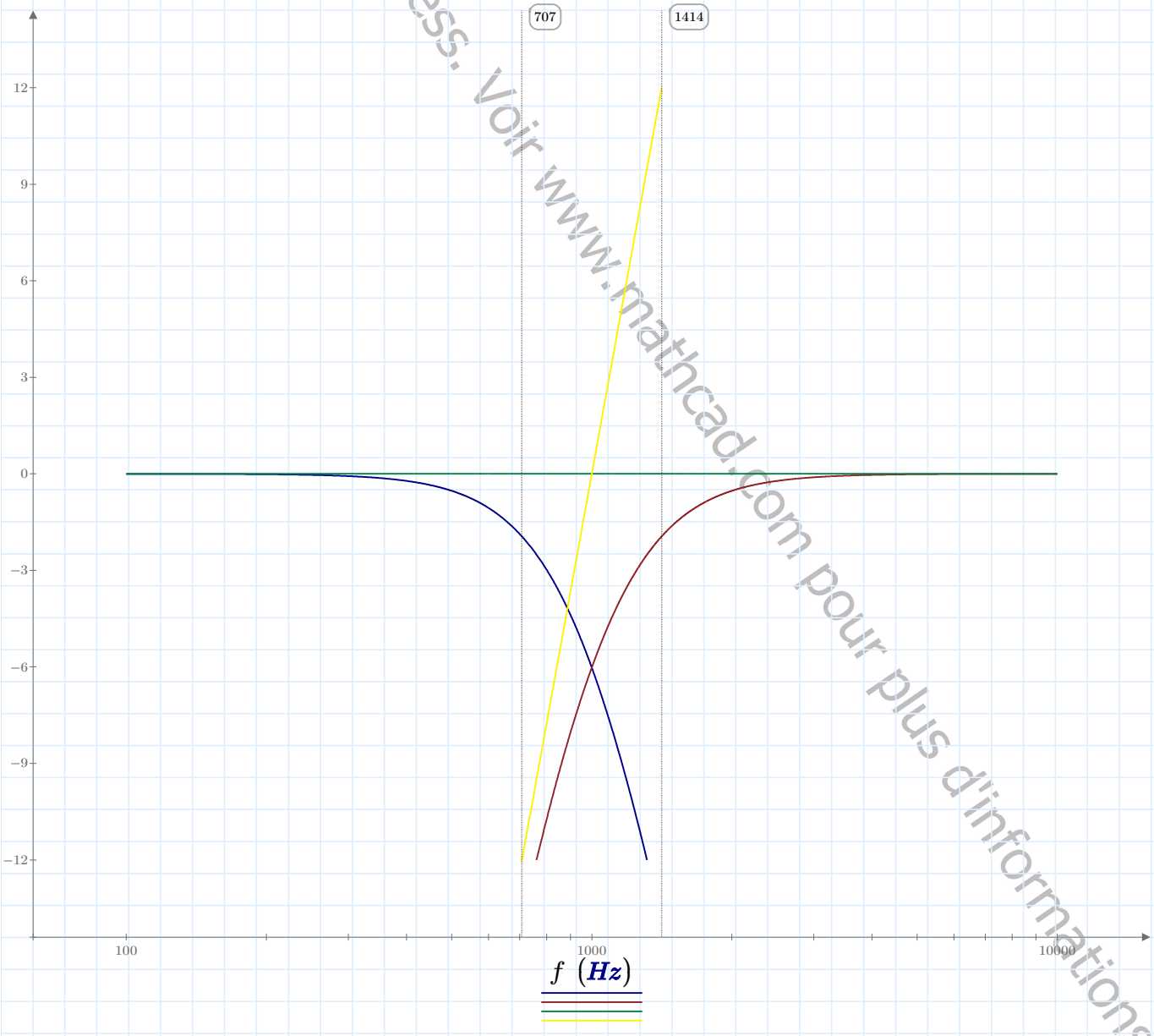
$$LR4_{High}(f) := \left(\frac{-\left(\frac{f}{fc}\right)^2}{1 + \sqrt{2} \cdot 1j \cdot \frac{f}{fc} - \left(\frac{f}{fc}\right)^2} \right)^2$$

$20 \cdot \log\left(\left|LR4_{Low}(f)\right|\right)$

$20 \cdot \log\left(\left|LR4_{High}(f)\right|\right)$

$20 \cdot \log\left(\left|LR4_{High}(f) + LR4_{Low}(f)\right|\right)$

$20 \cdot \log\left(\left|\frac{LR4_{High}(f)}{LR4_{Low}(f)}\right|\right)$



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