

EPFL

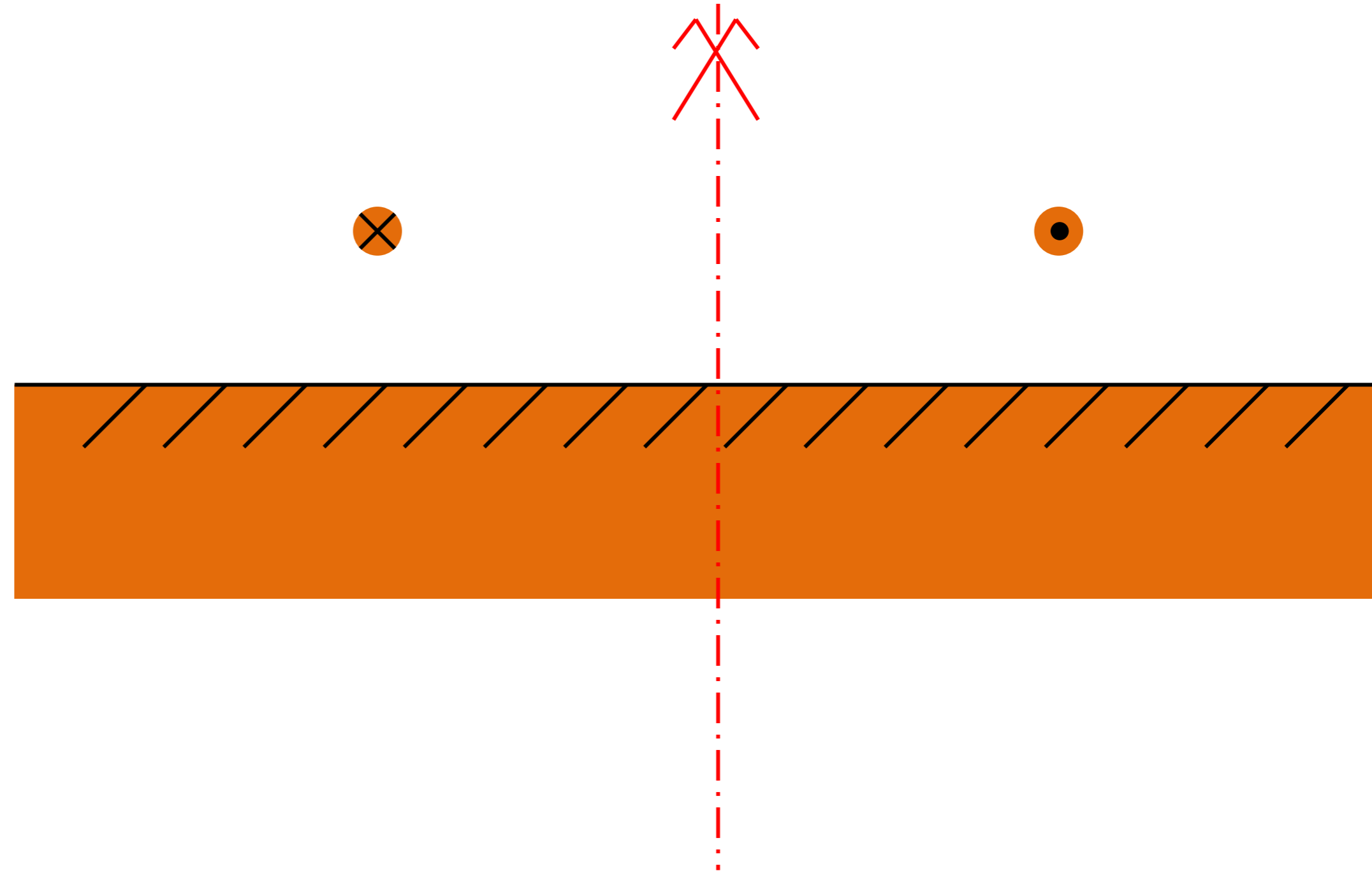
«Pertes Fer»

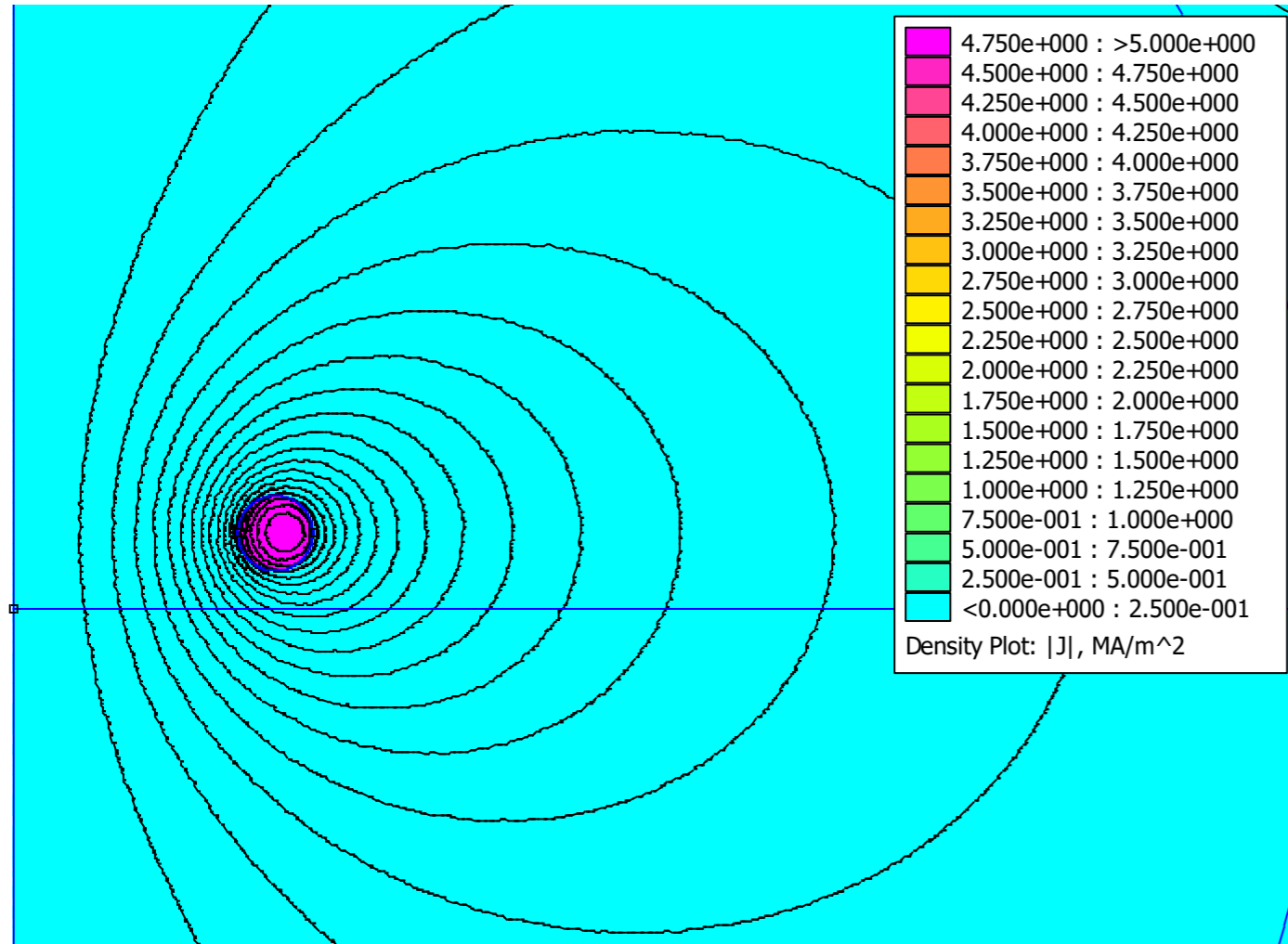
Actioneurs et systèmes électromagnétiques

Christian Koechli

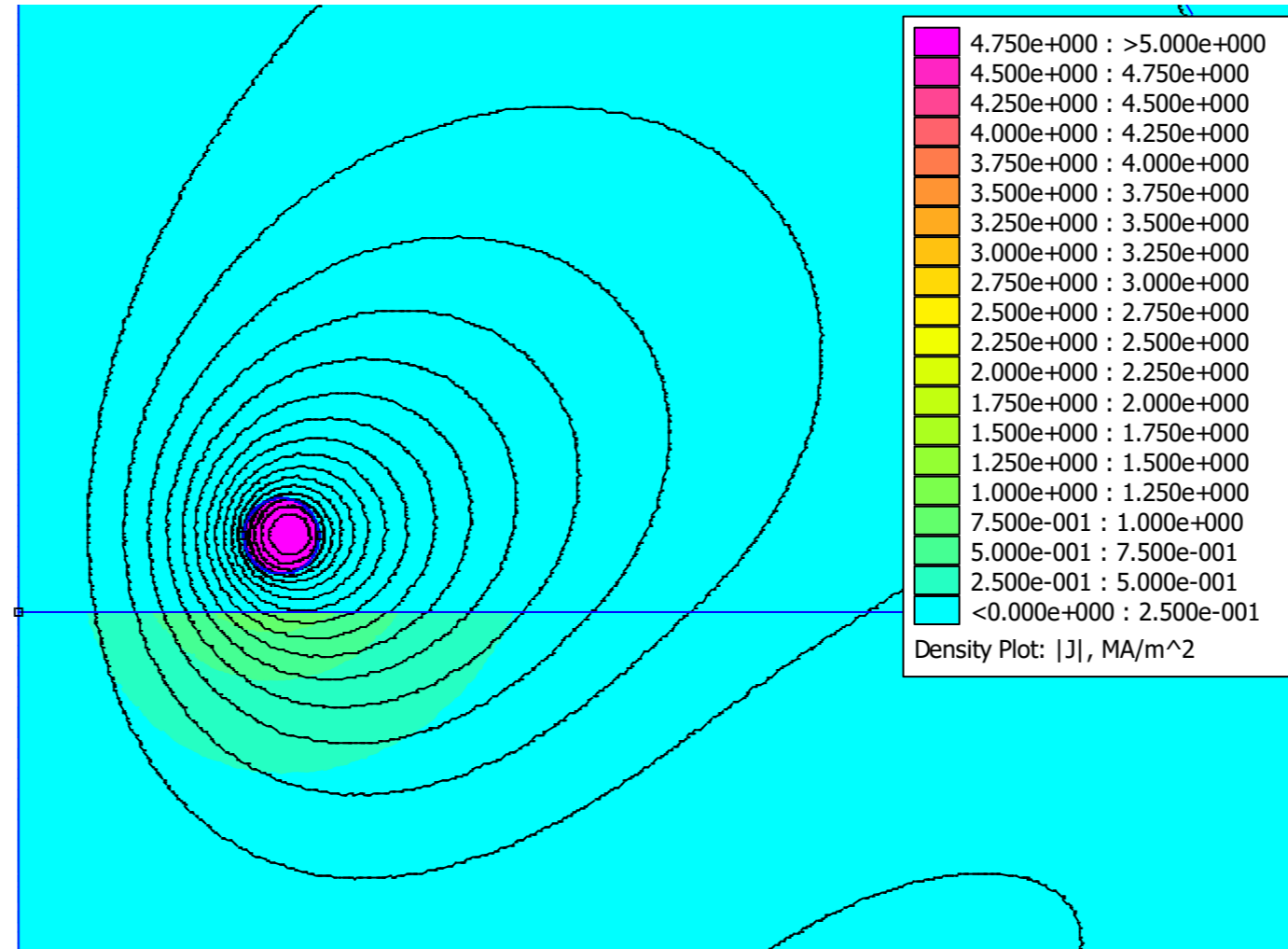
Courants de Foucault

$$\overrightarrow{\text{rot}} \vec{E} = -\frac{\partial \vec{B}}{\partial t}$$
$$\vec{E} = \rho \vec{J}$$

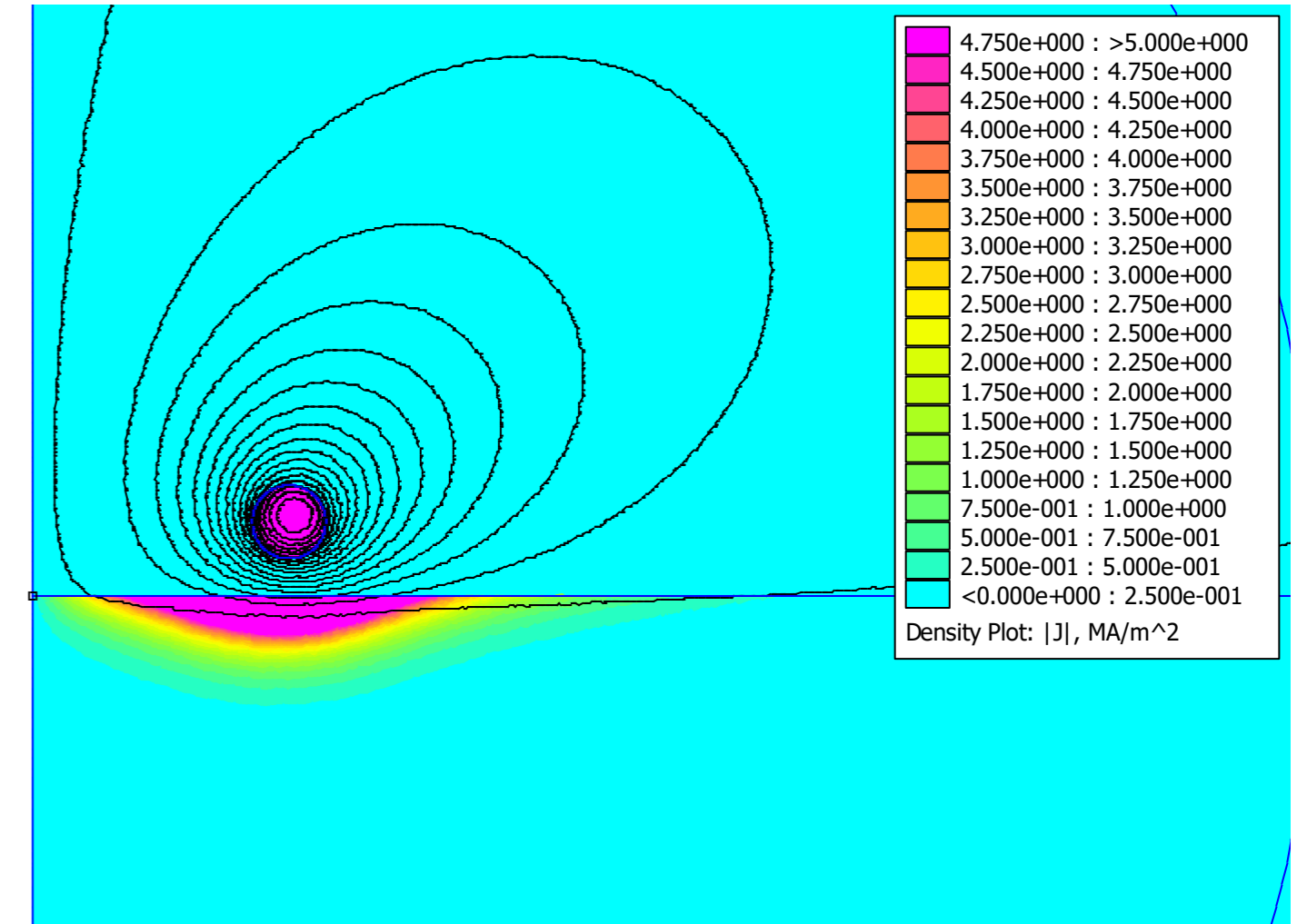




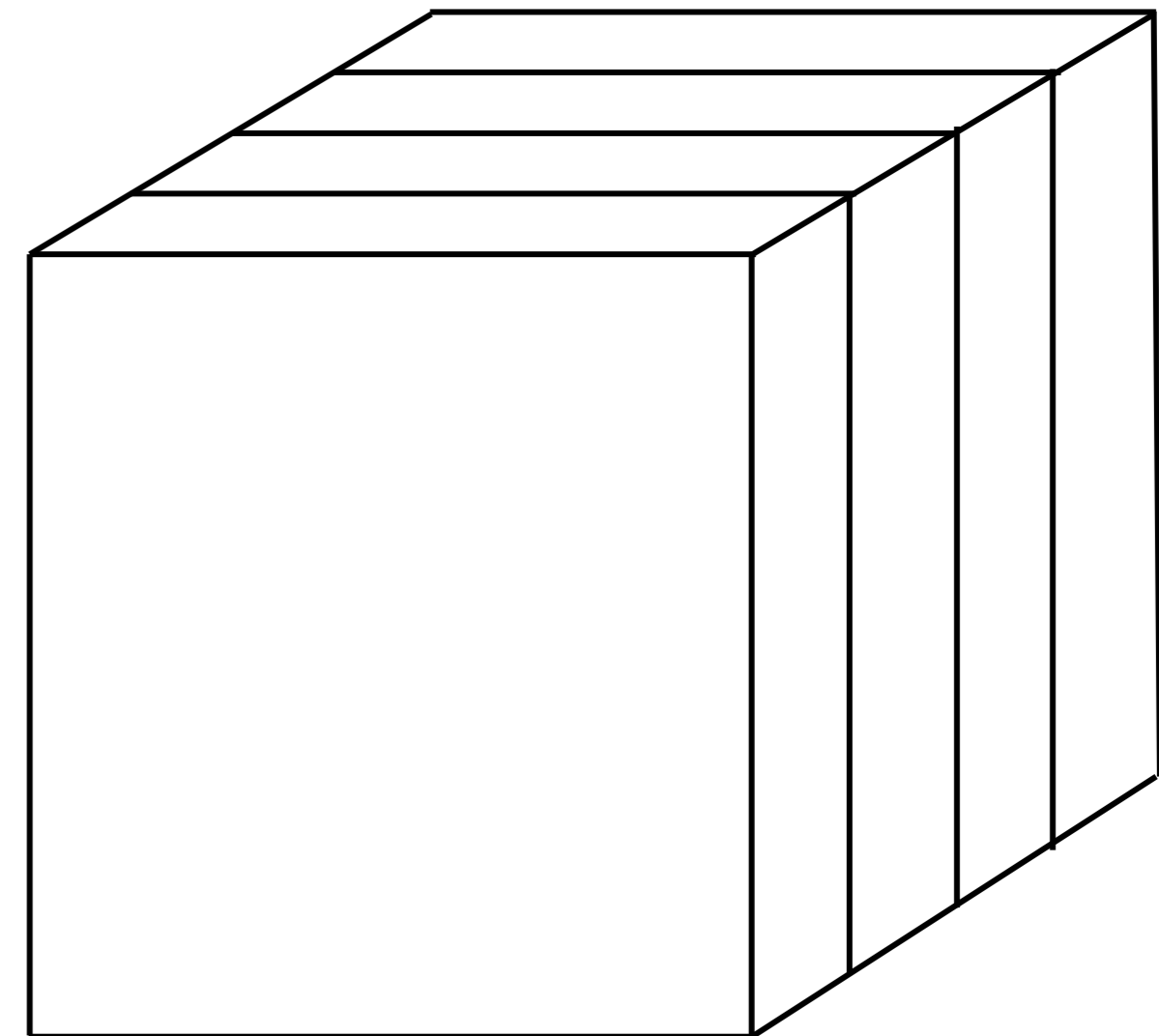
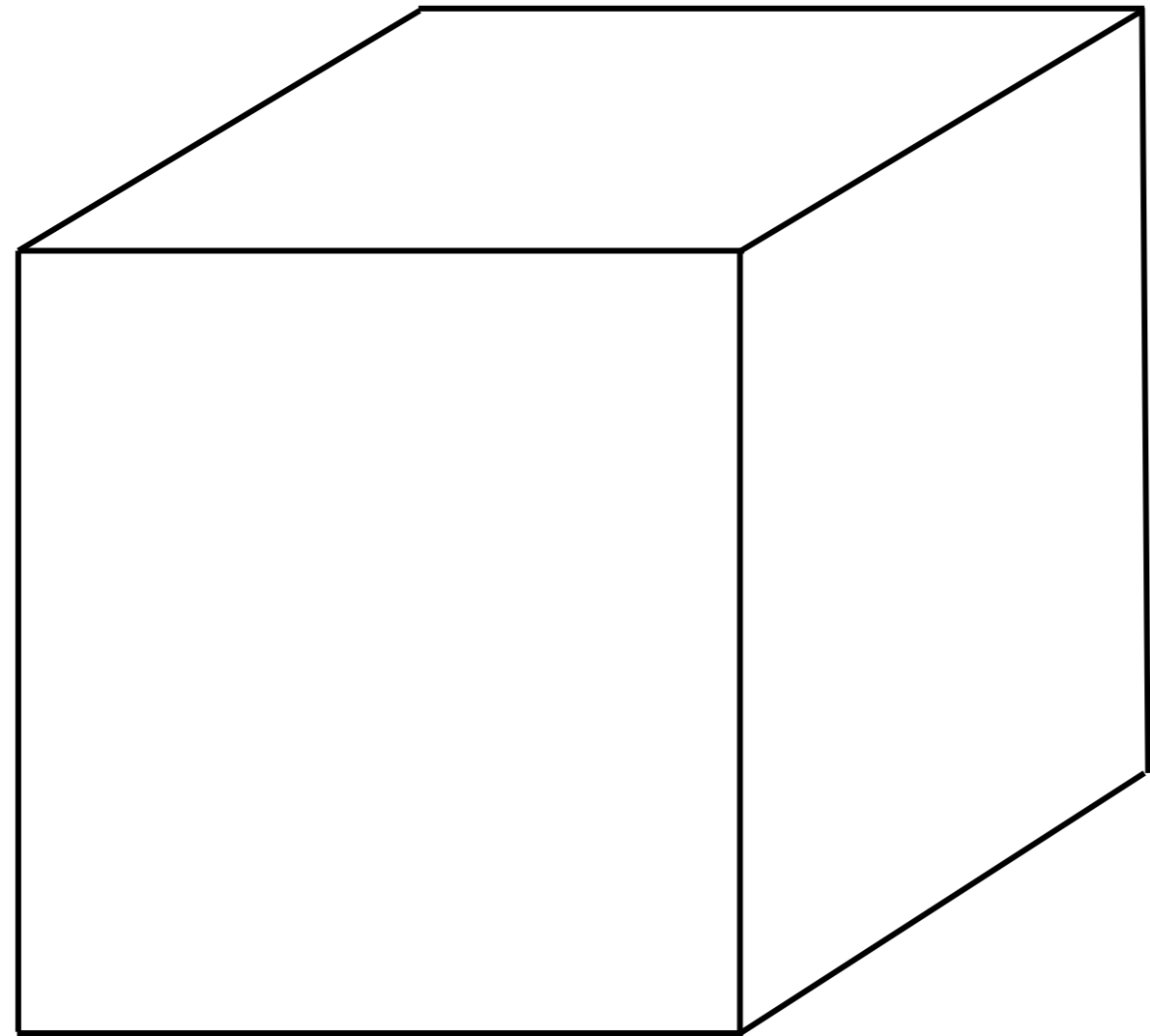
1Hz



100Hz



10kHz

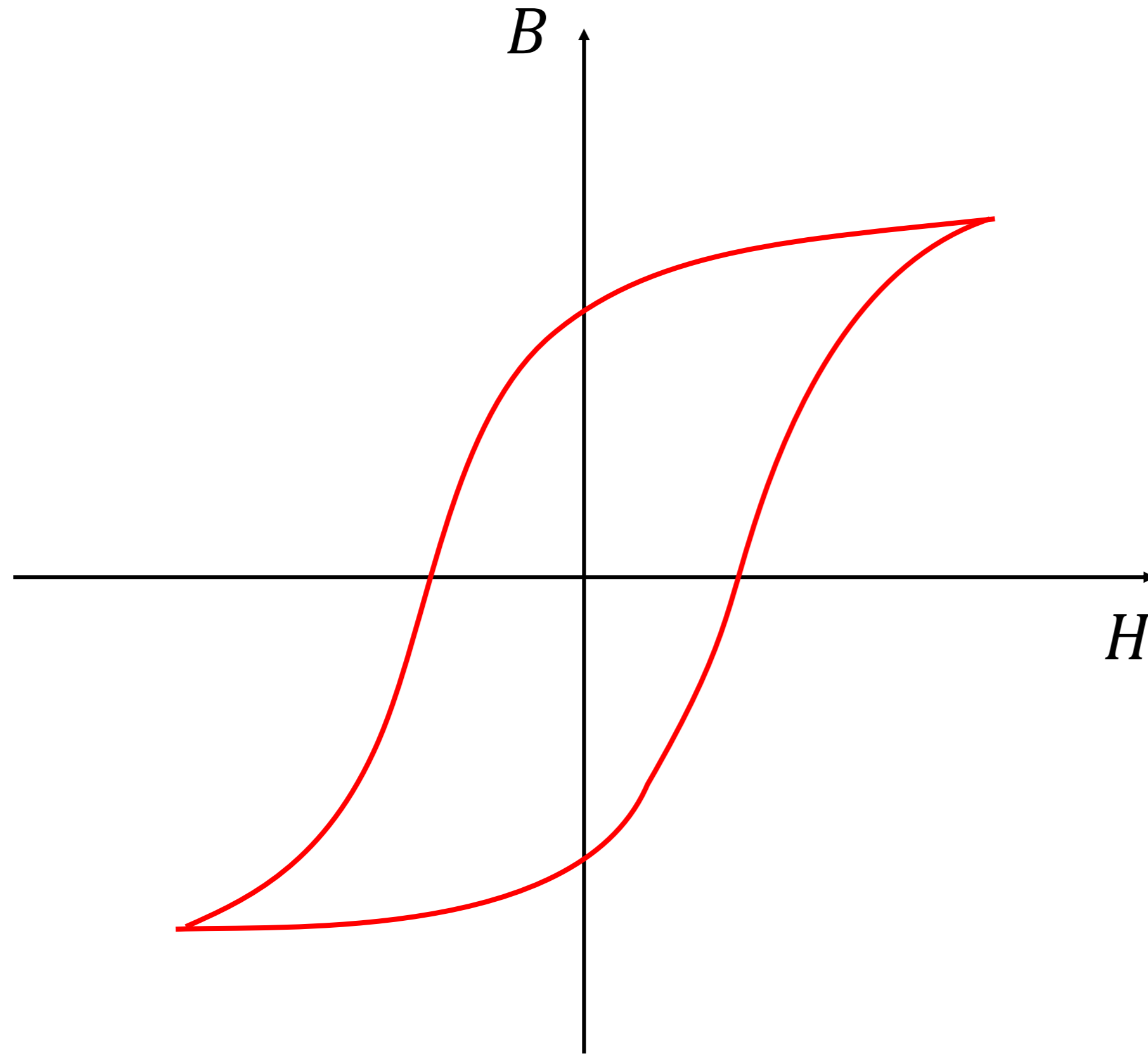


- $I_{Foucault}$ créés par B variable
- Le champ généré s'oppose au champ d'excitation

- Pertes proportionnelles à:
 - B^2
 - e^2
 - f^2

- Solution:
 - résistivité du matériau
 - empilage de tôles

Hysteresis



$$W = \int H dB$$

Pertes fer

$$P_{fer} = P_{Foucault} + P_{Hysteresis}$$

$$P_{Fer} = m_{fer} C_p \left(\frac{f}{f_{ref}} \right)^k \left(\frac{\hat{B}}{\hat{B}_{ref}} \right)^2$$

