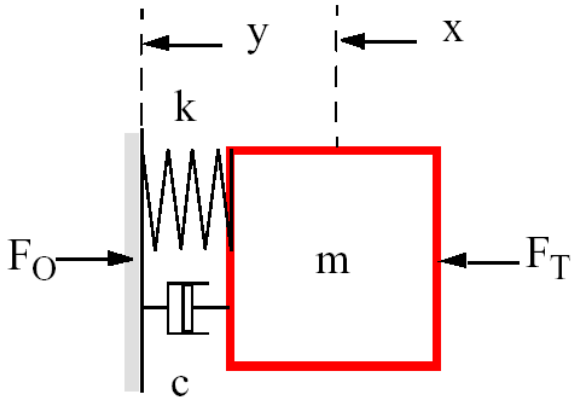
Resonantie onderzoek

Frans Assink

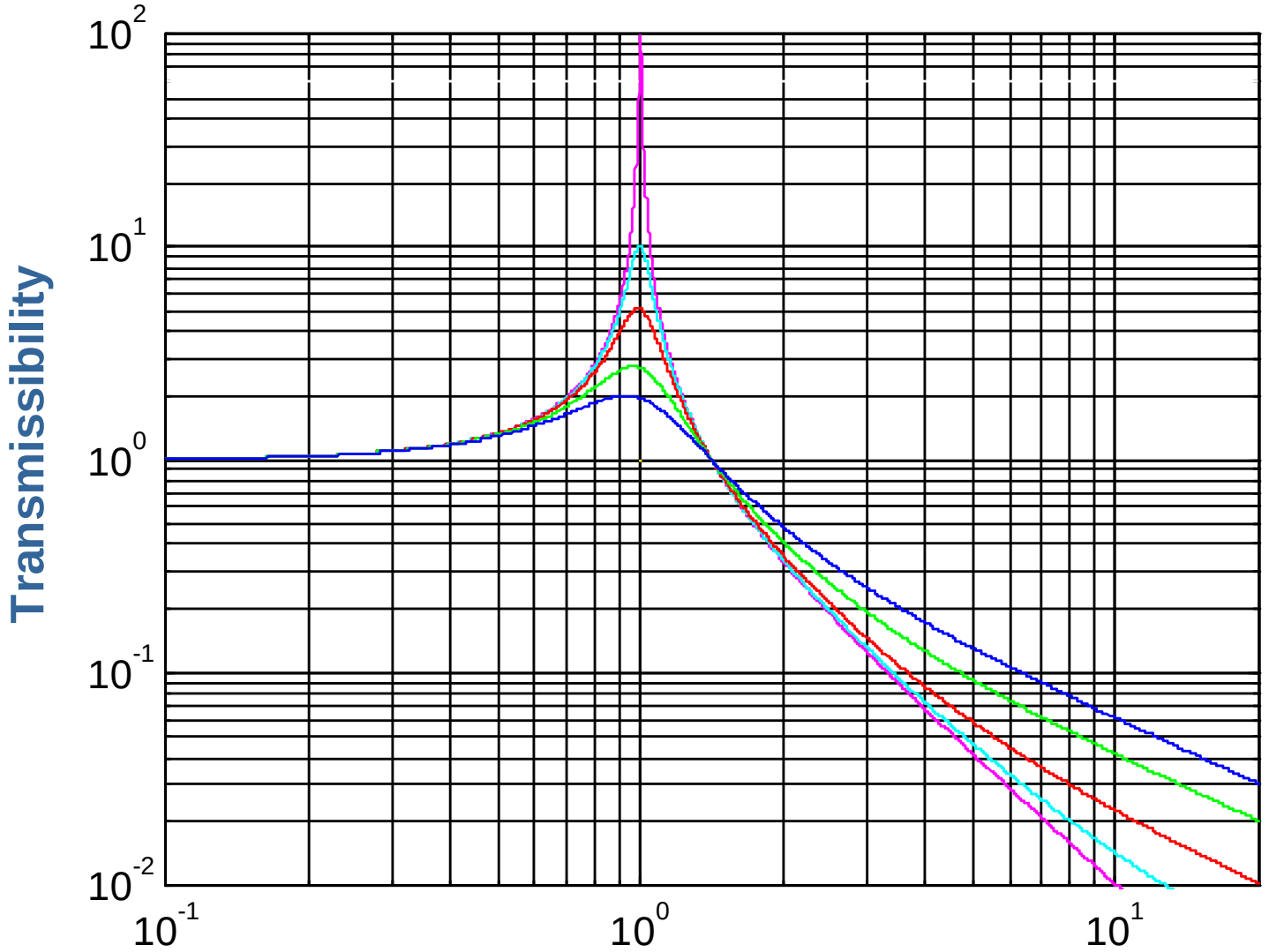


DE TRANSMISSIBILITY IS HET DIMENSIELOZE QUOTIENT VAN DE RESPONSIE AMPLITUDE VAN EEN SYTEEM OP EEN GEDWONGEN FREQUENTIE. HET QUOTIENT MAG VAN KRACHTEN VERSNELLINGEN, SNELHEDEN OF VERPLAATSING ZIJN.

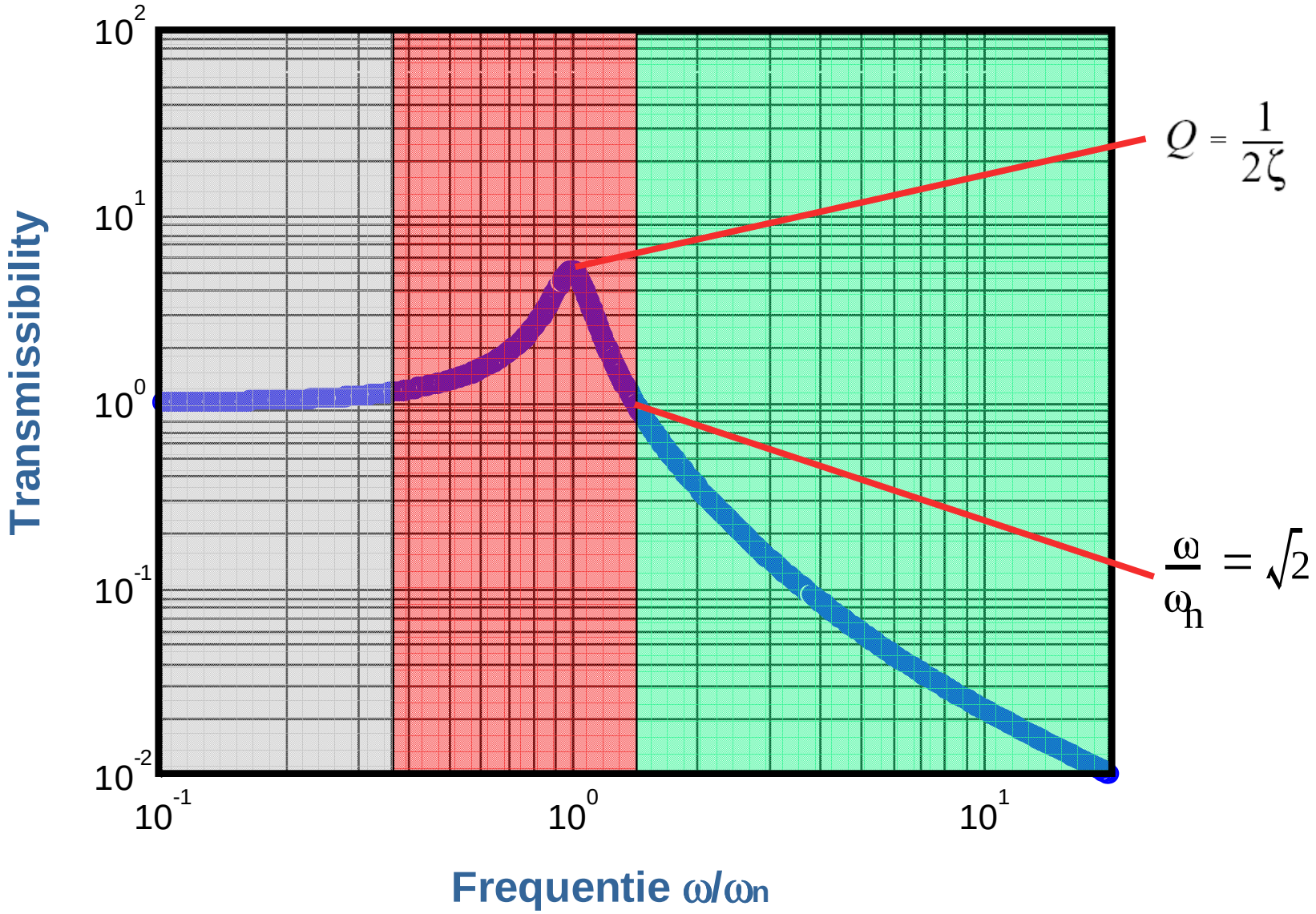
$$T = \sqrt{\frac{1 + \left(\frac{2\zeta\omega}{\omega_n}\right)^2}{\left(1 - \frac{\omega^2}{\omega_n^2}\right)^2 + \left(\frac{2\zeta\omega}{\omega_n}\right)^2}}$$

$$\psi = \operatorname{atan} \frac{2\zeta\left(\frac{\omega}{\omega_n}\right)^3}{1 - \left(\frac{\omega}{\omega_n}\right)^2 + 4\zeta^2\left(\frac{\omega}{\omega_n}\right)^2}$$

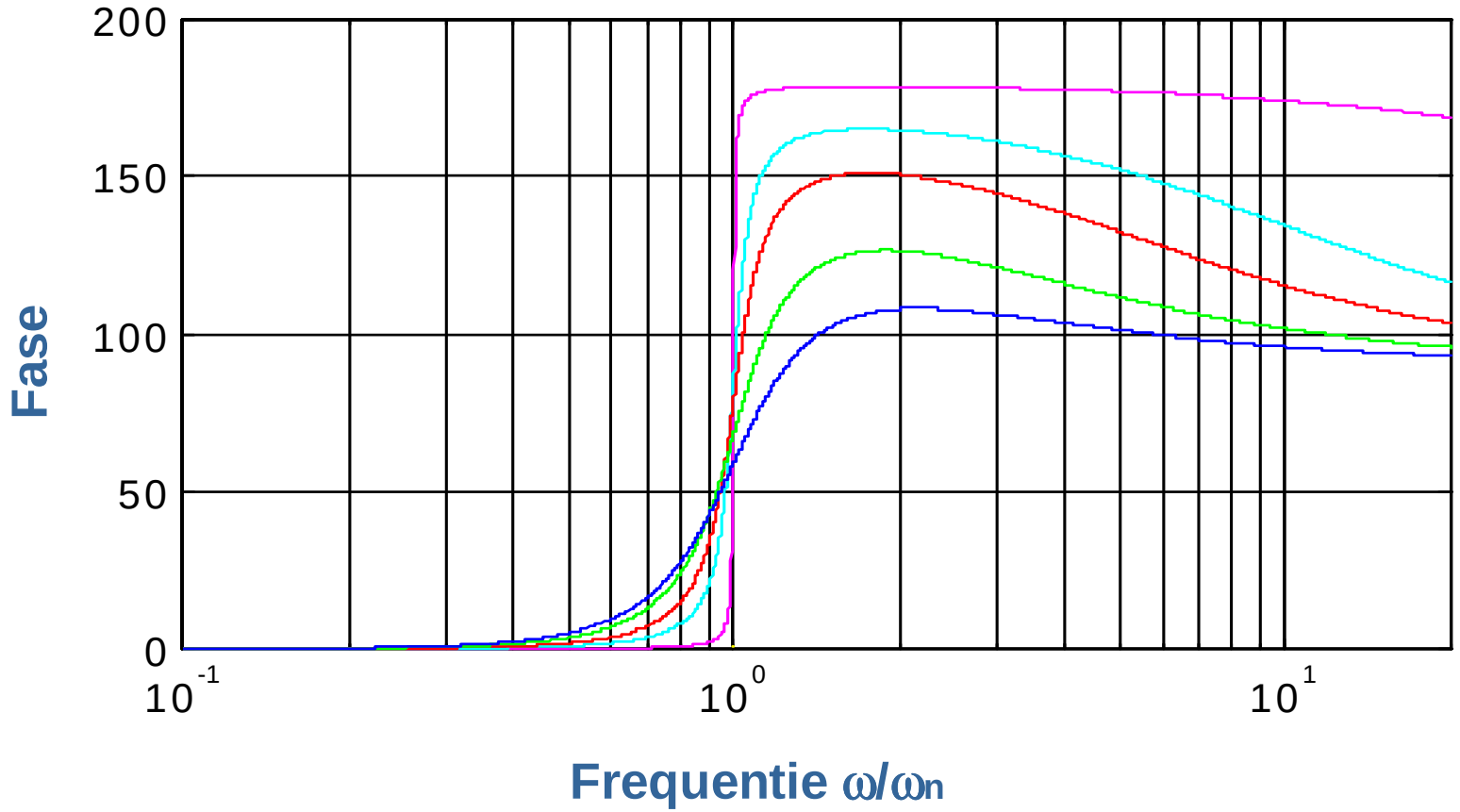
Transmissibility grafiek



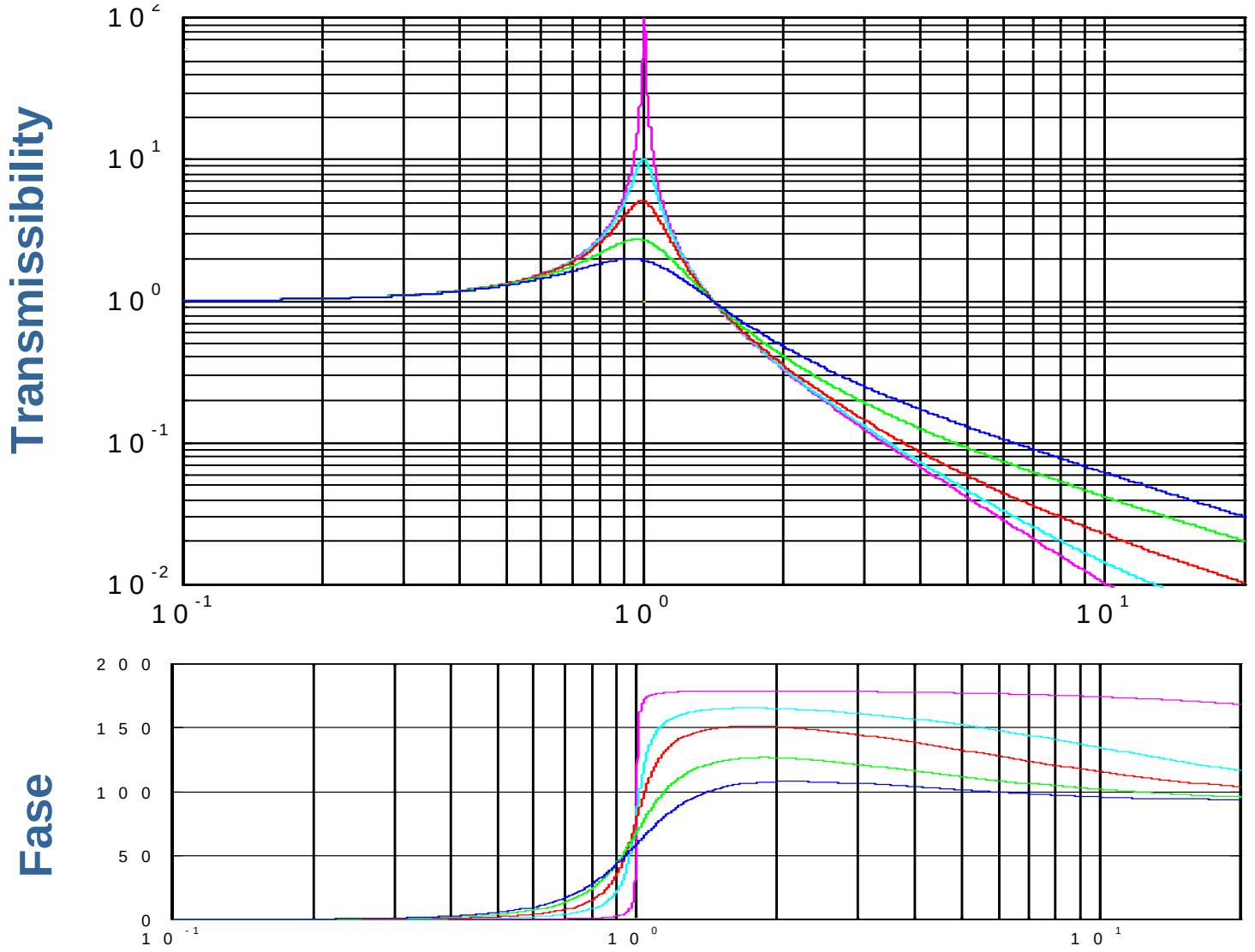
Gebieden in de transmissibility grafiek



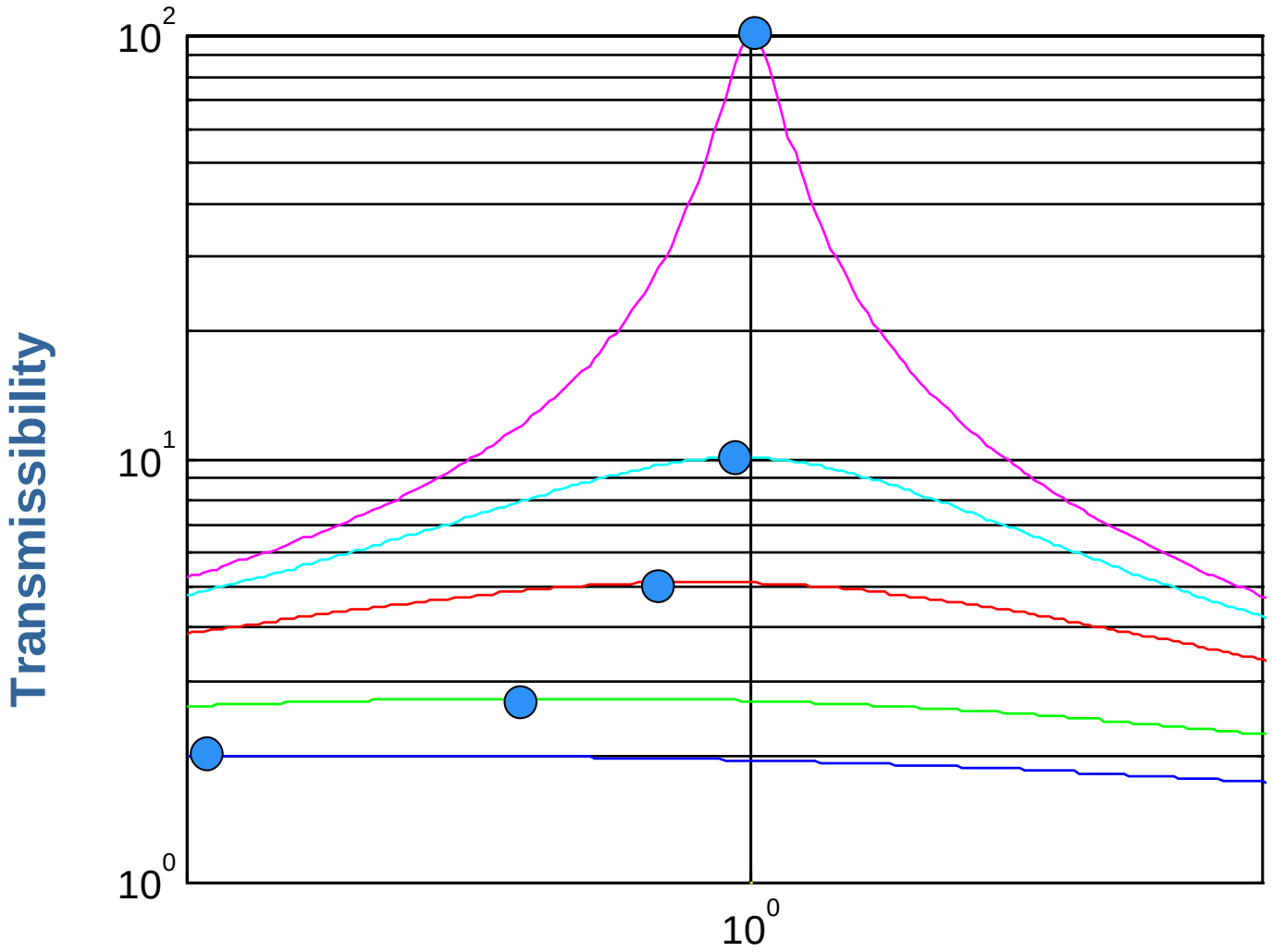
Fase diagram



Transmissibility en fase diagram



Verschillende eigenfrequenties?



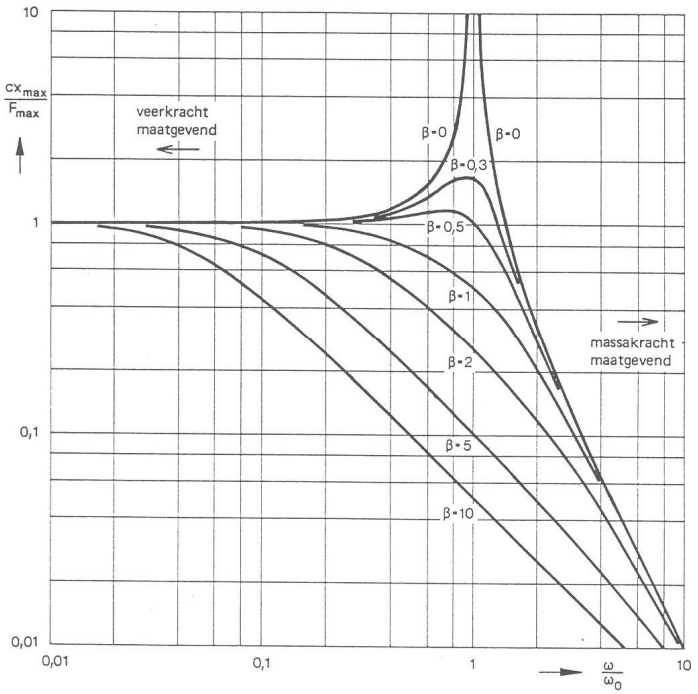
Soorten eigenfrequenties

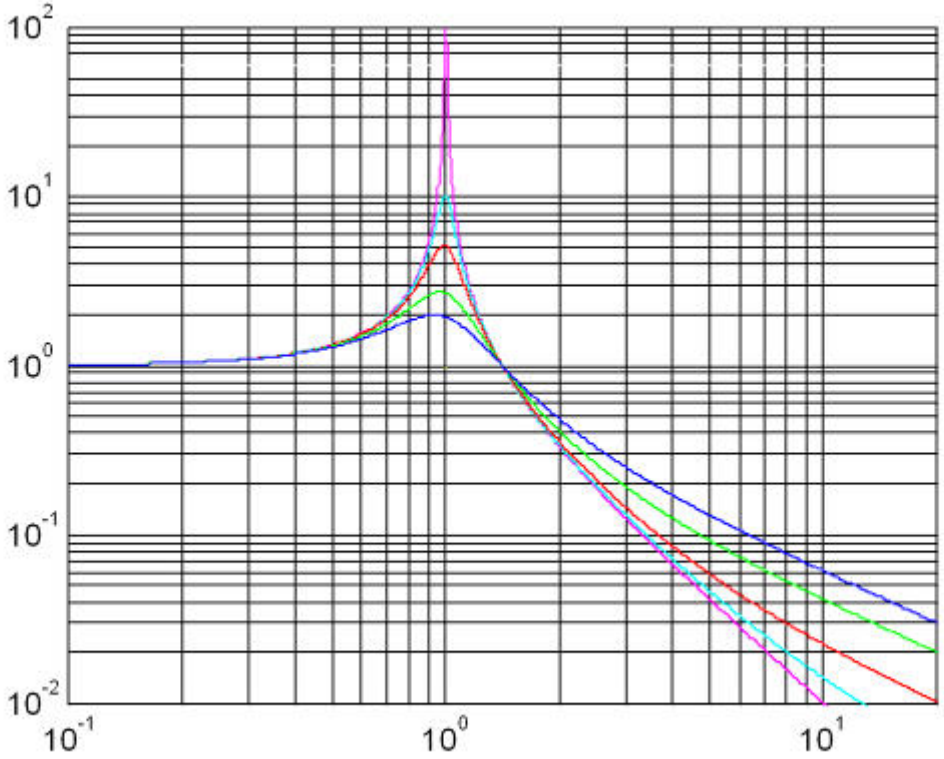
ω_n **Ongedempte eigenfrequentie**

$\omega_n\sqrt{(1-\zeta^2)}$ **Gedempte eigenfrequentie**

$Q = \frac{1}{2\zeta}$ **Q-factor (Opslingeringsfactor Versterkingsfactor)**

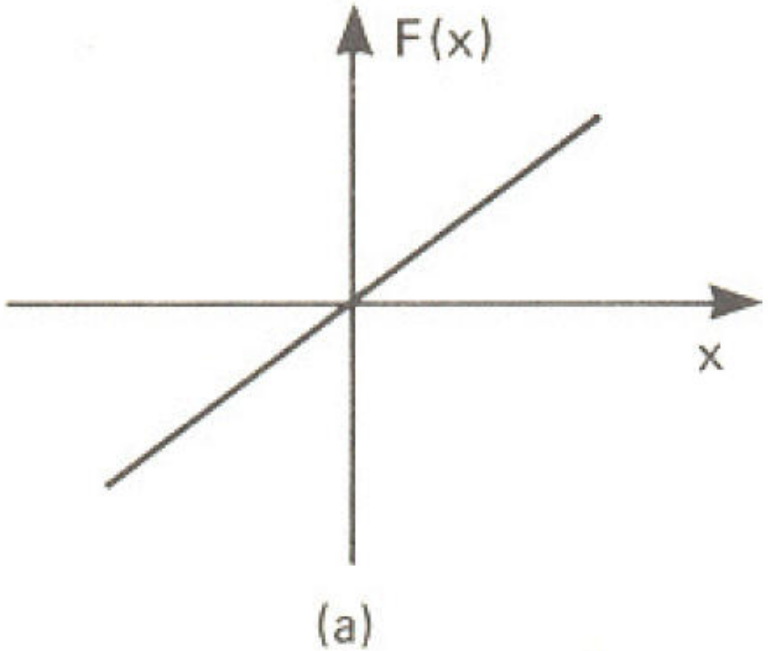
Grafieken en de verwarring



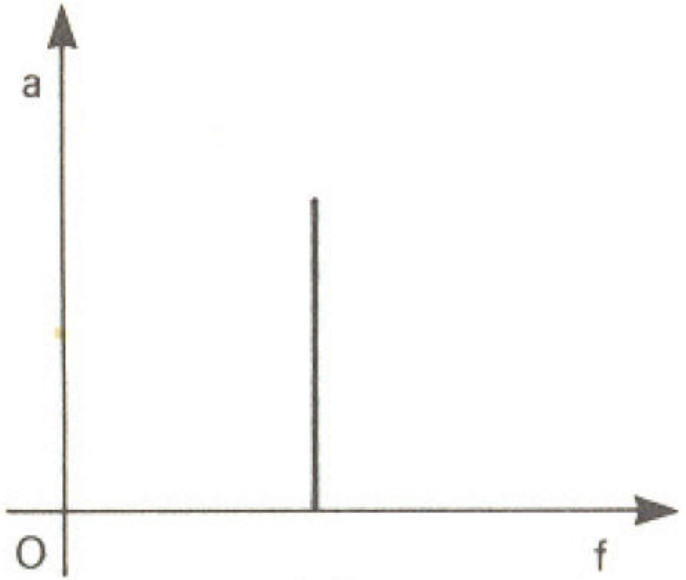


THALES

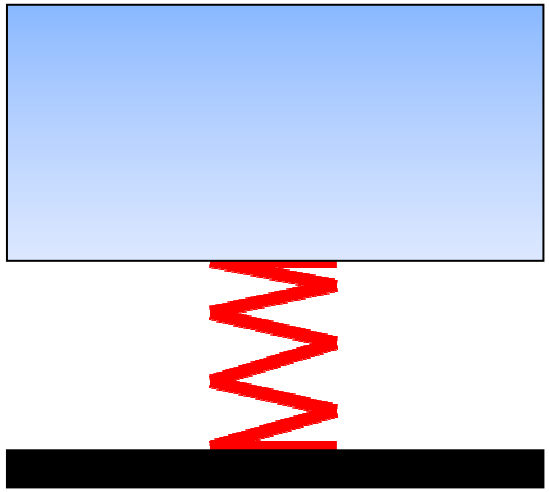
Lineaire stijfheid



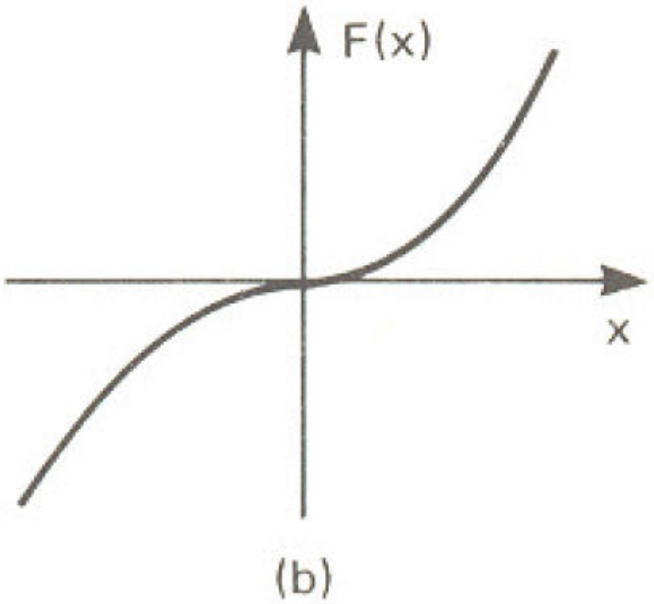
(a)

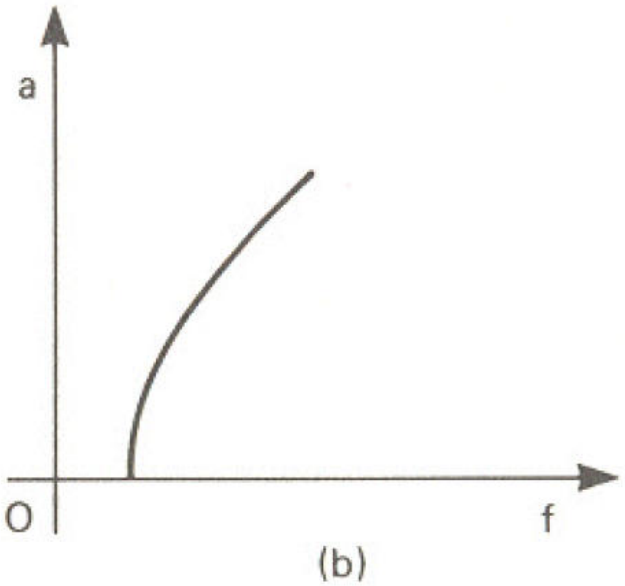


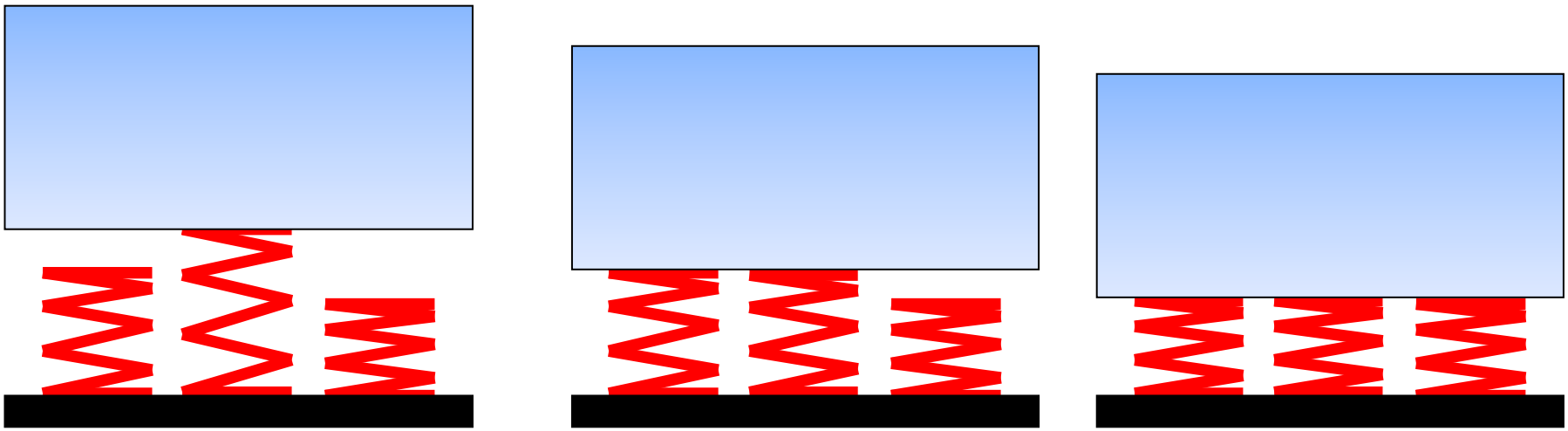
(a)



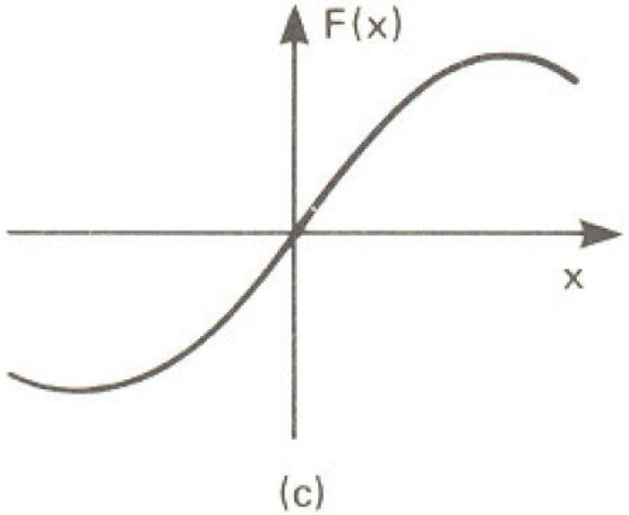
Progressieve stijfheidlus

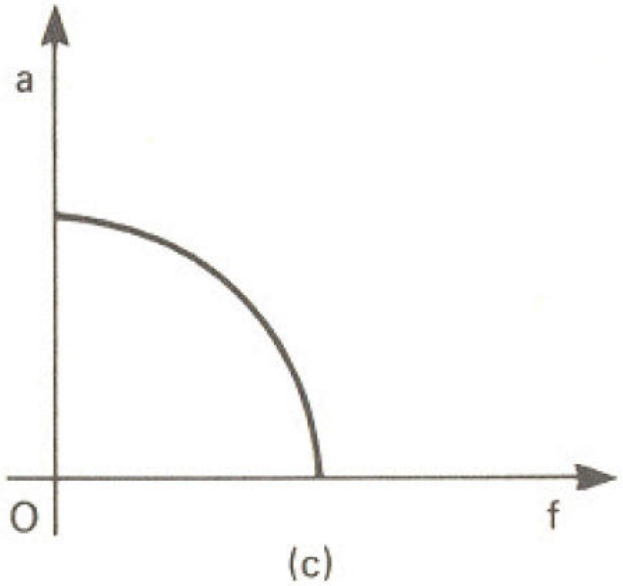


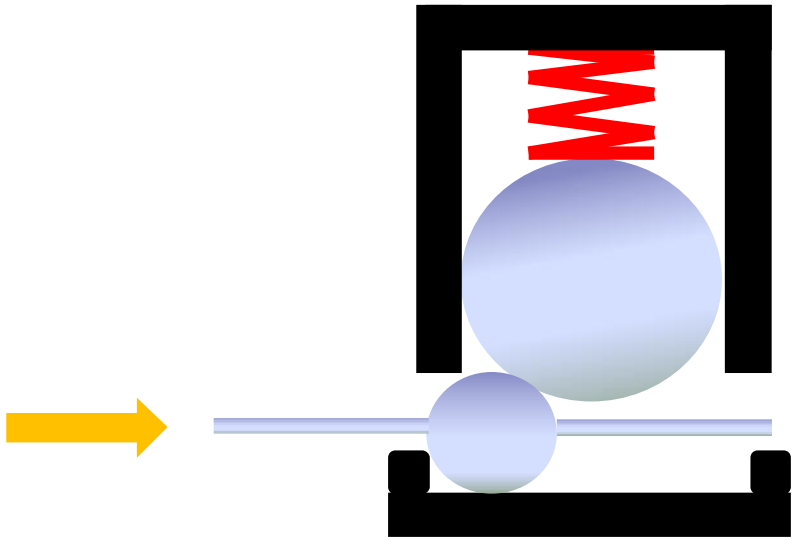




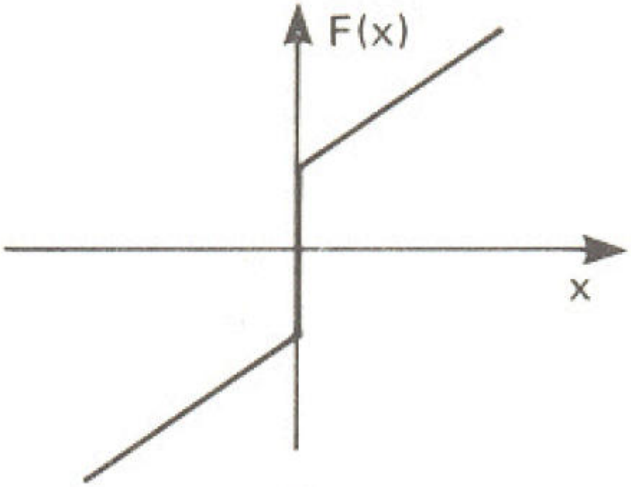
Degressieve stijfheidlus

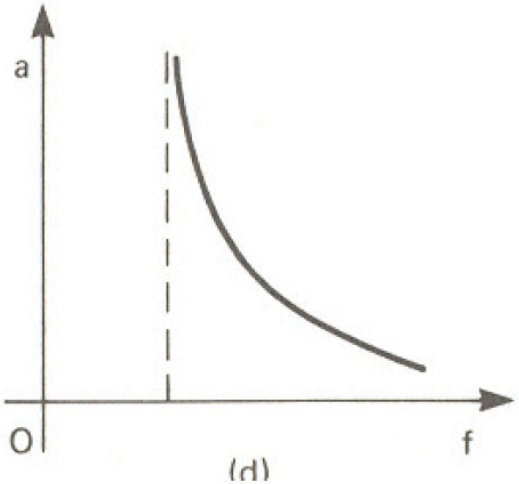


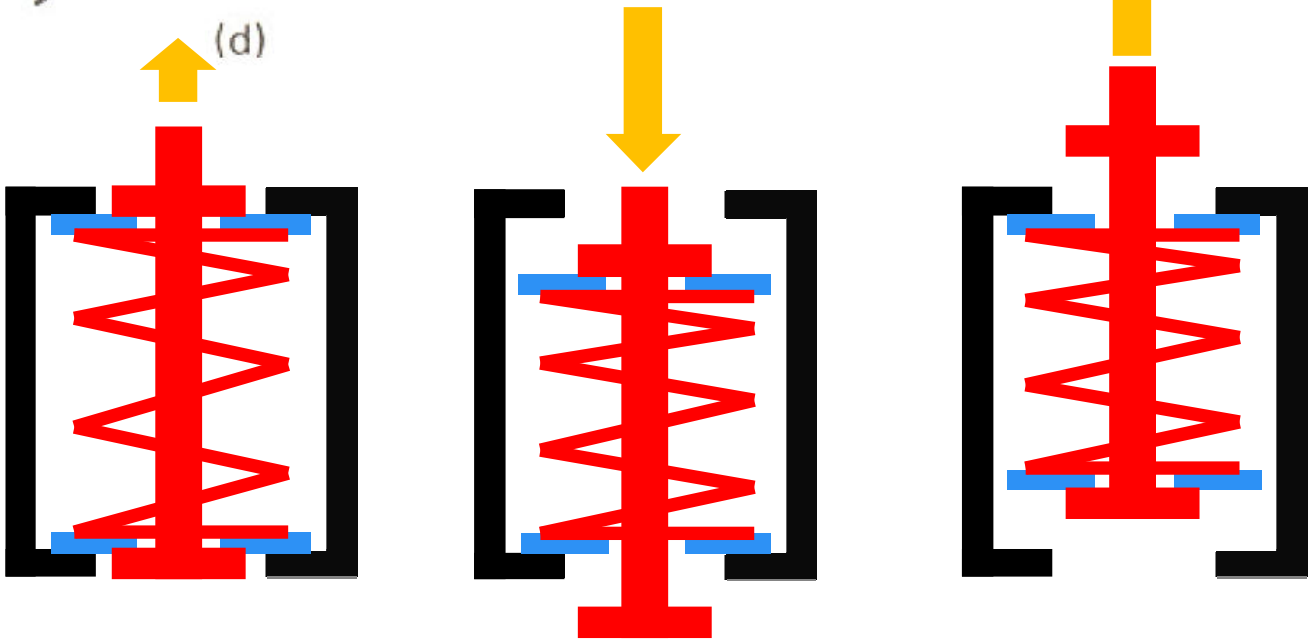




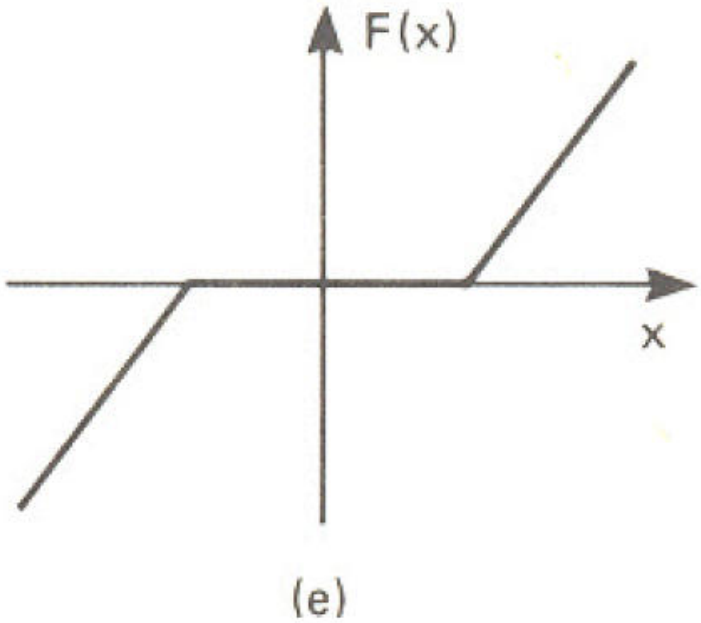
Voorgespannen stijfheidlus



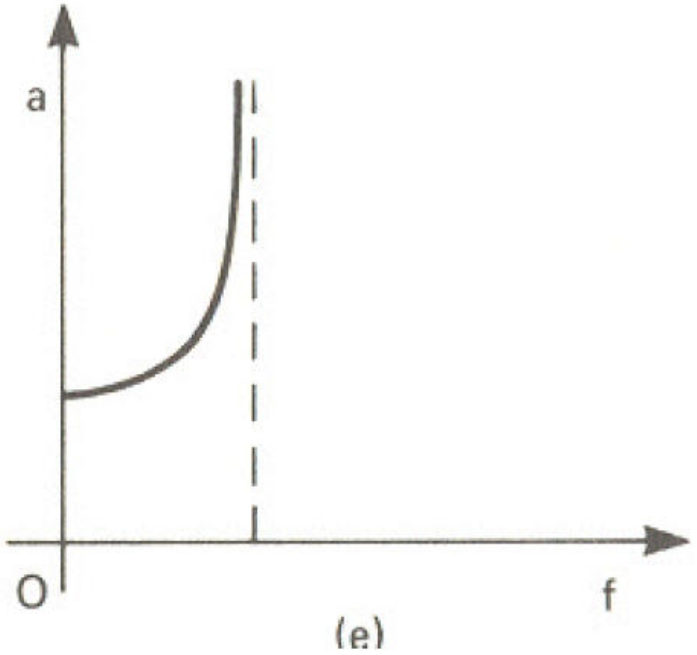




Stijheidlus met speling



(e)



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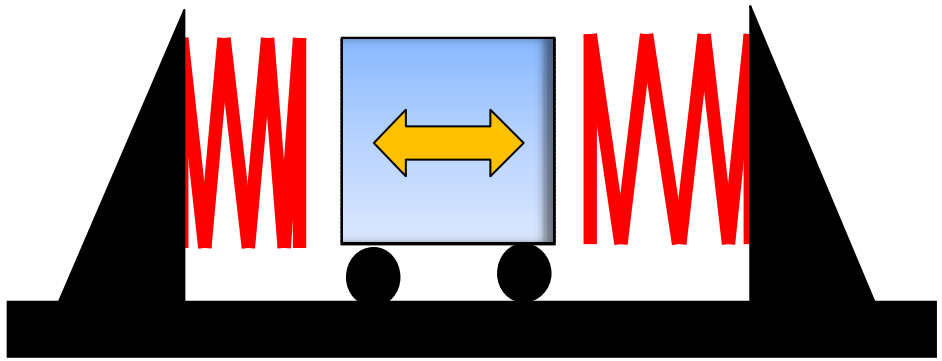
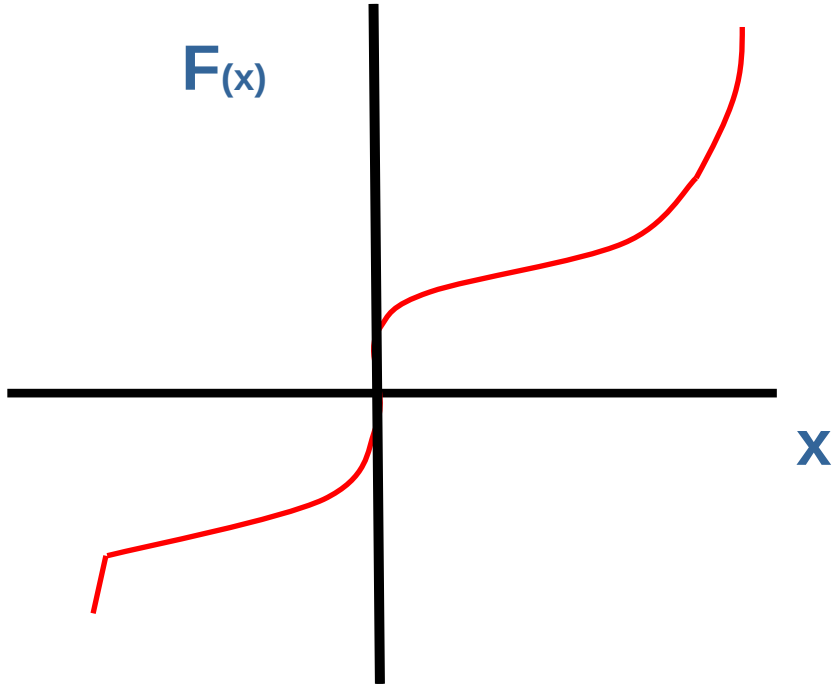
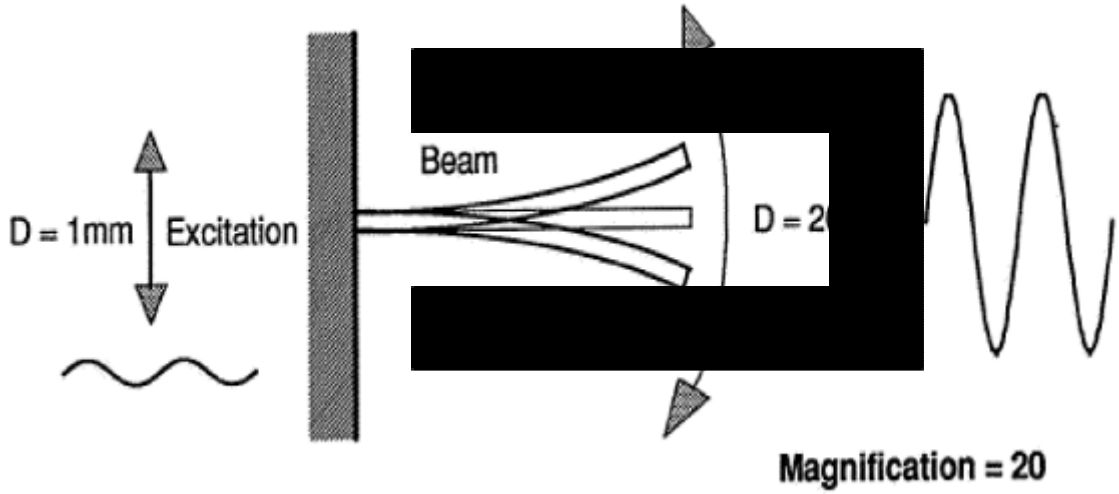
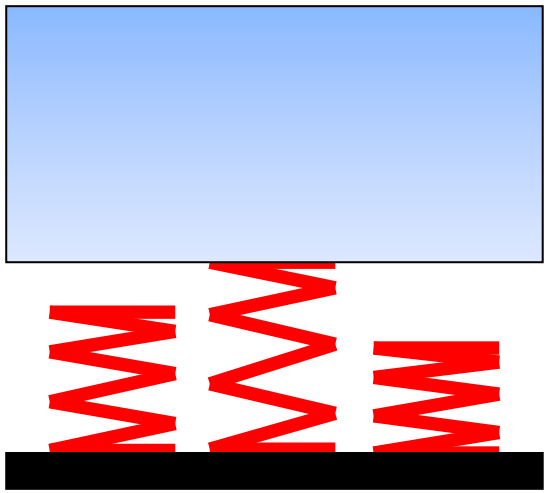


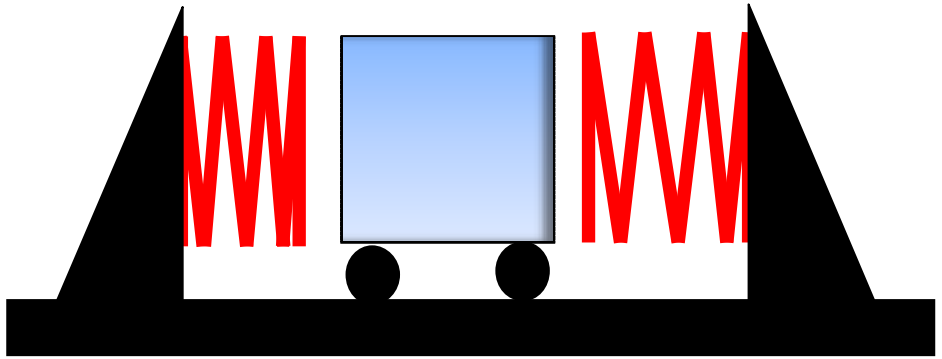
Combinatie van stijheidlussen

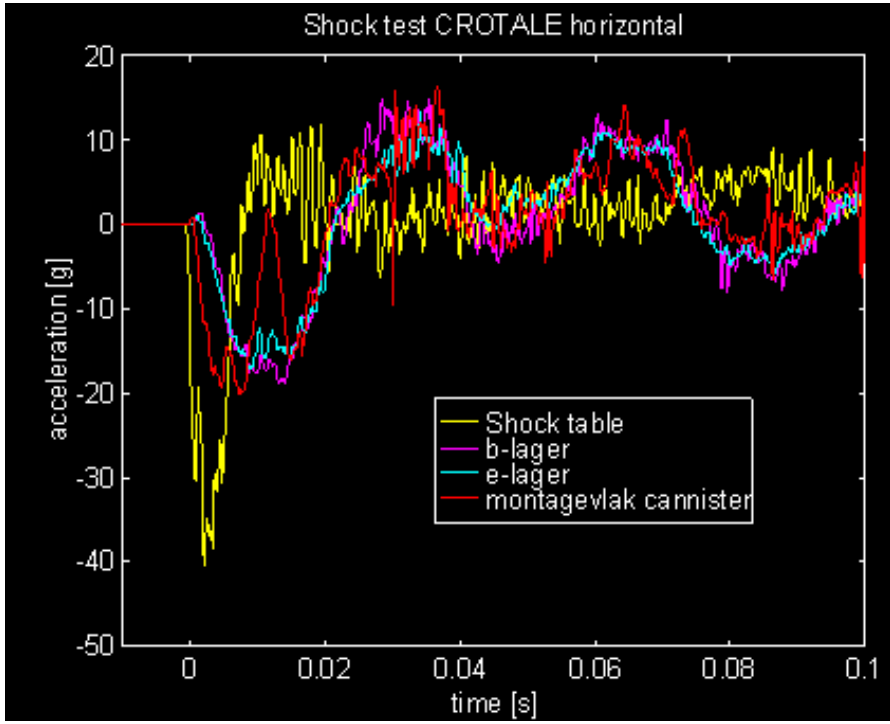


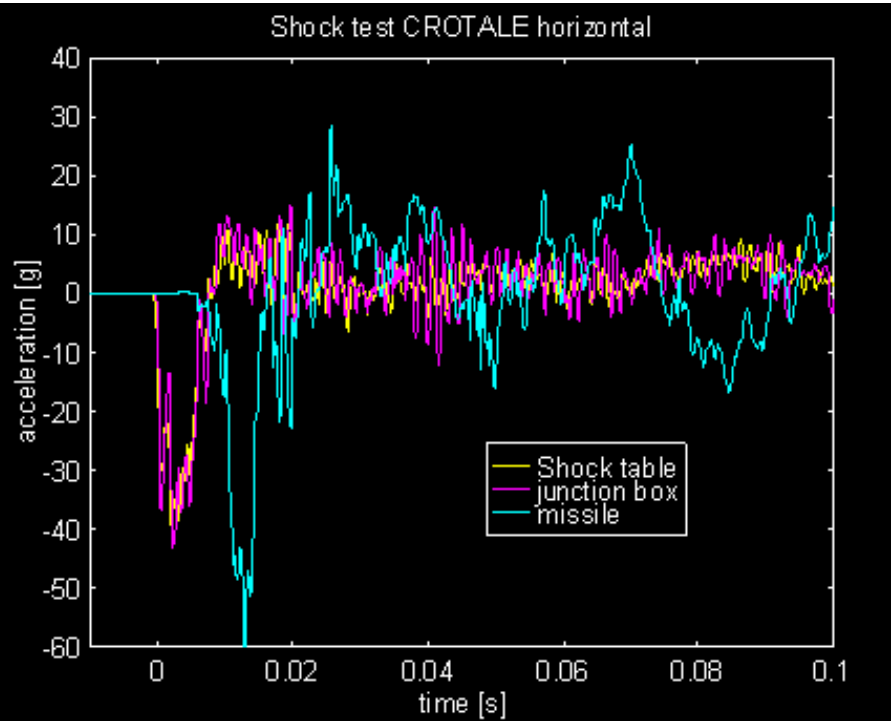
Te gebruiken amplitude voor resonantie onderzoek





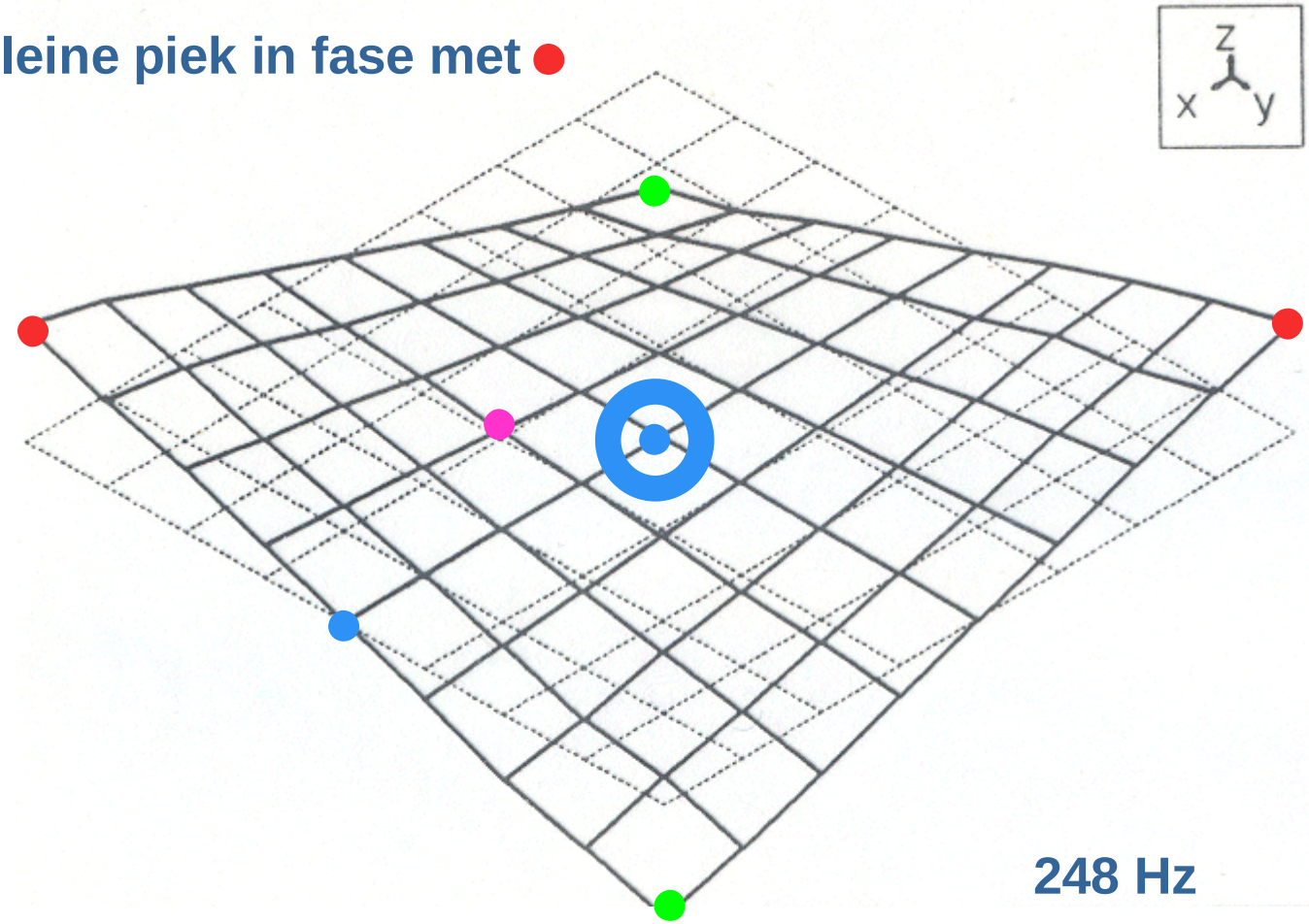






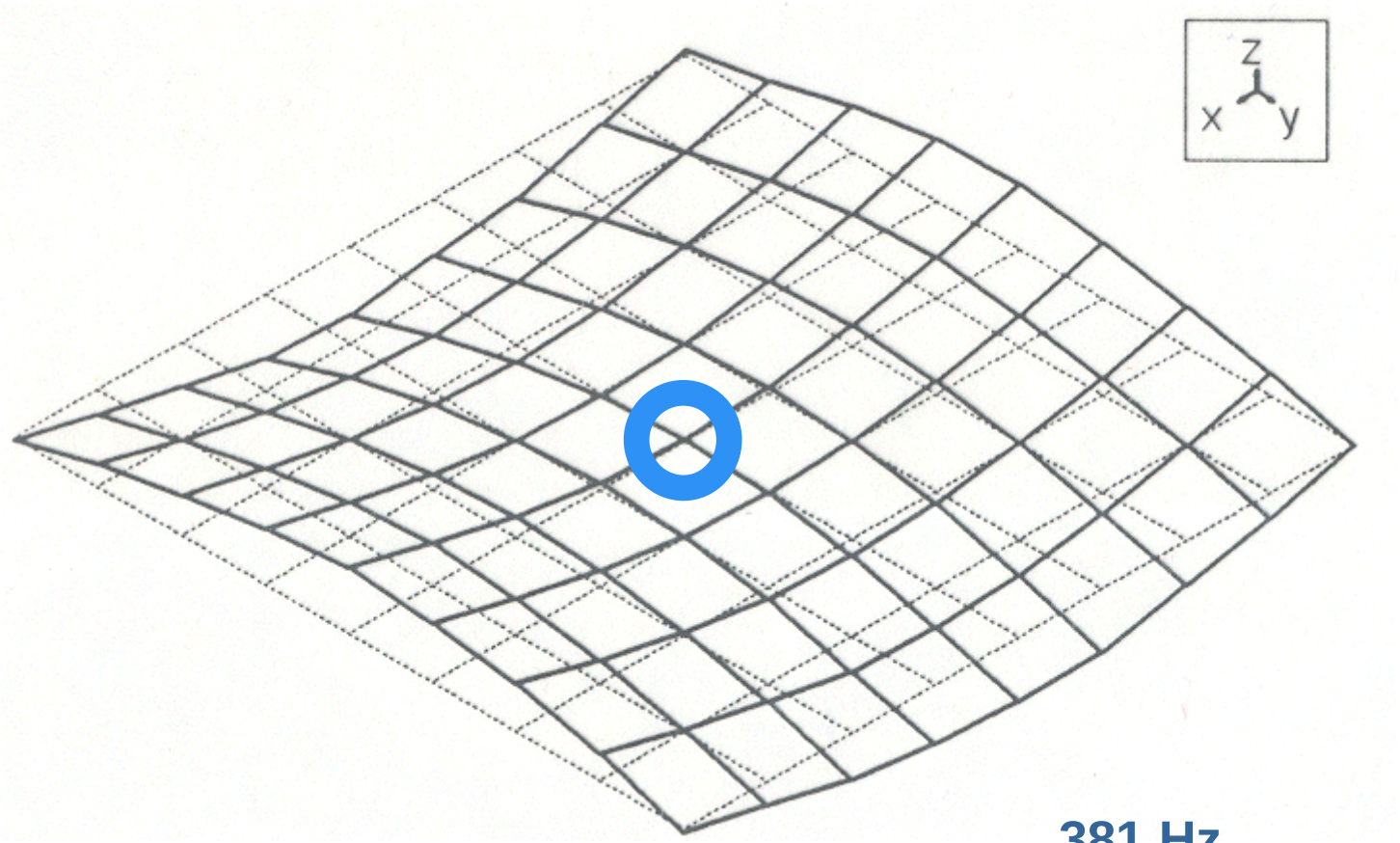
PLAATSEN VAN DE OPNEMER

- Hoge piek in het spectrum maar in tegen fase met
- Kleine piek in fase met



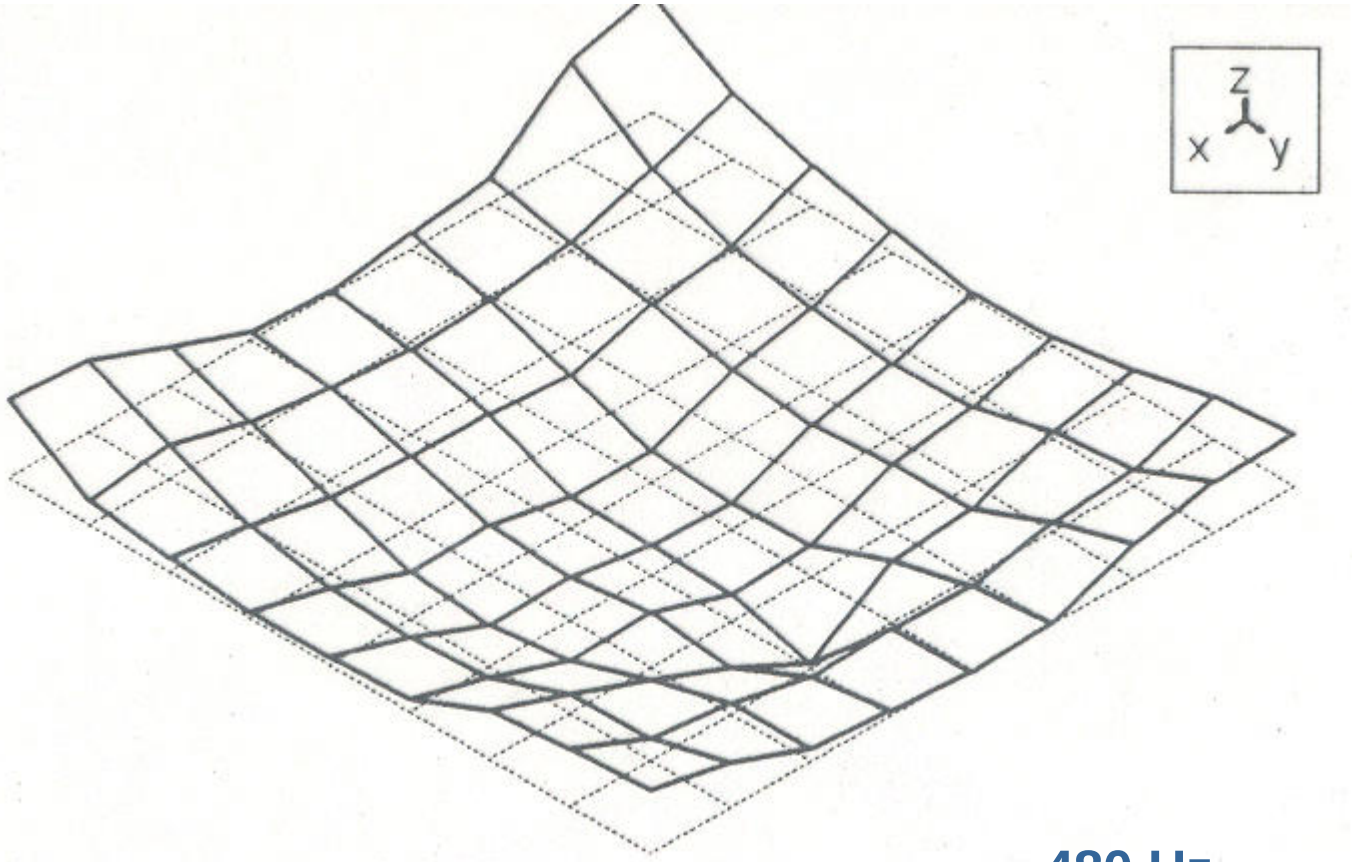
- Geen piek in het spectrum

Modale analyse



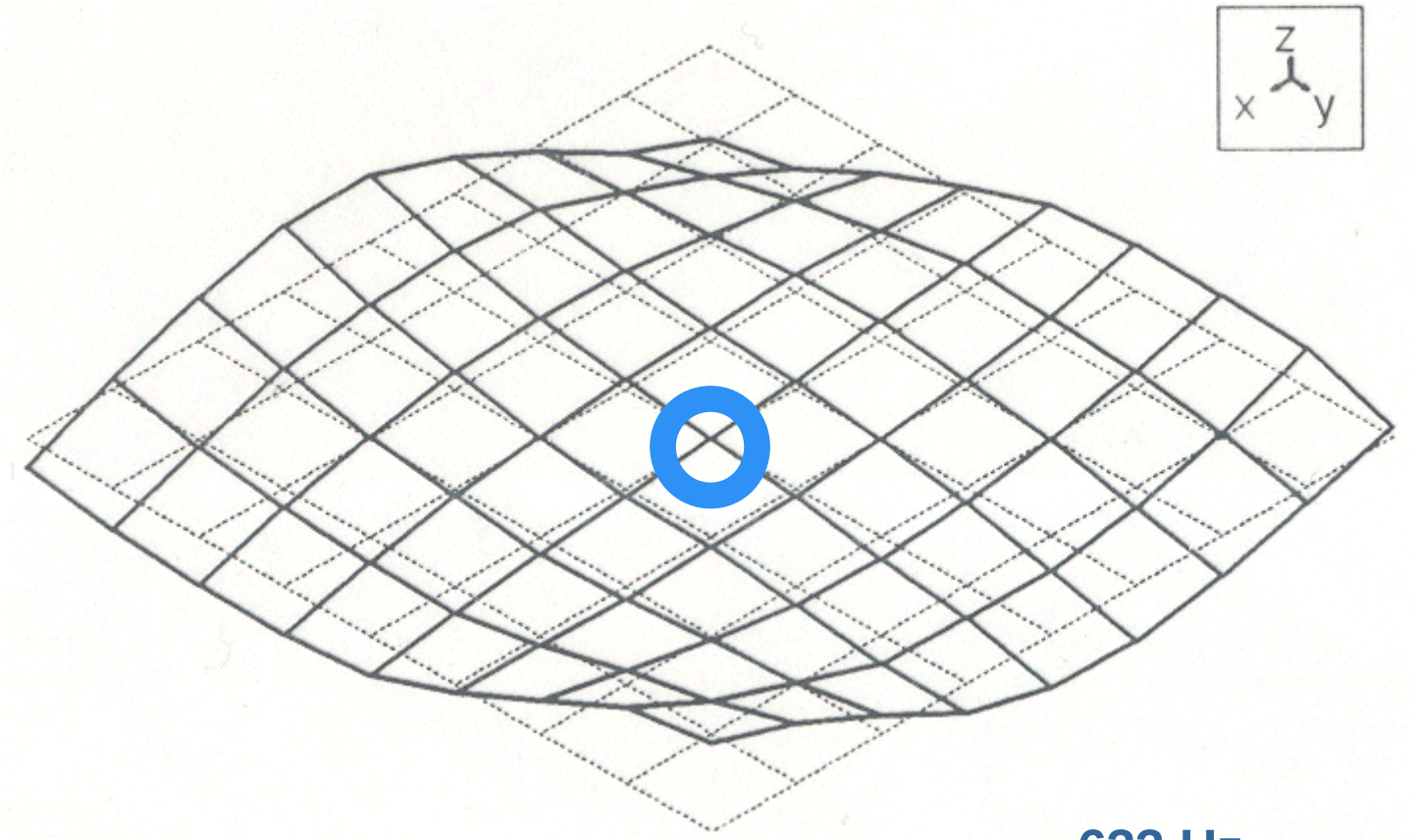
381 Hz

Modale analyse



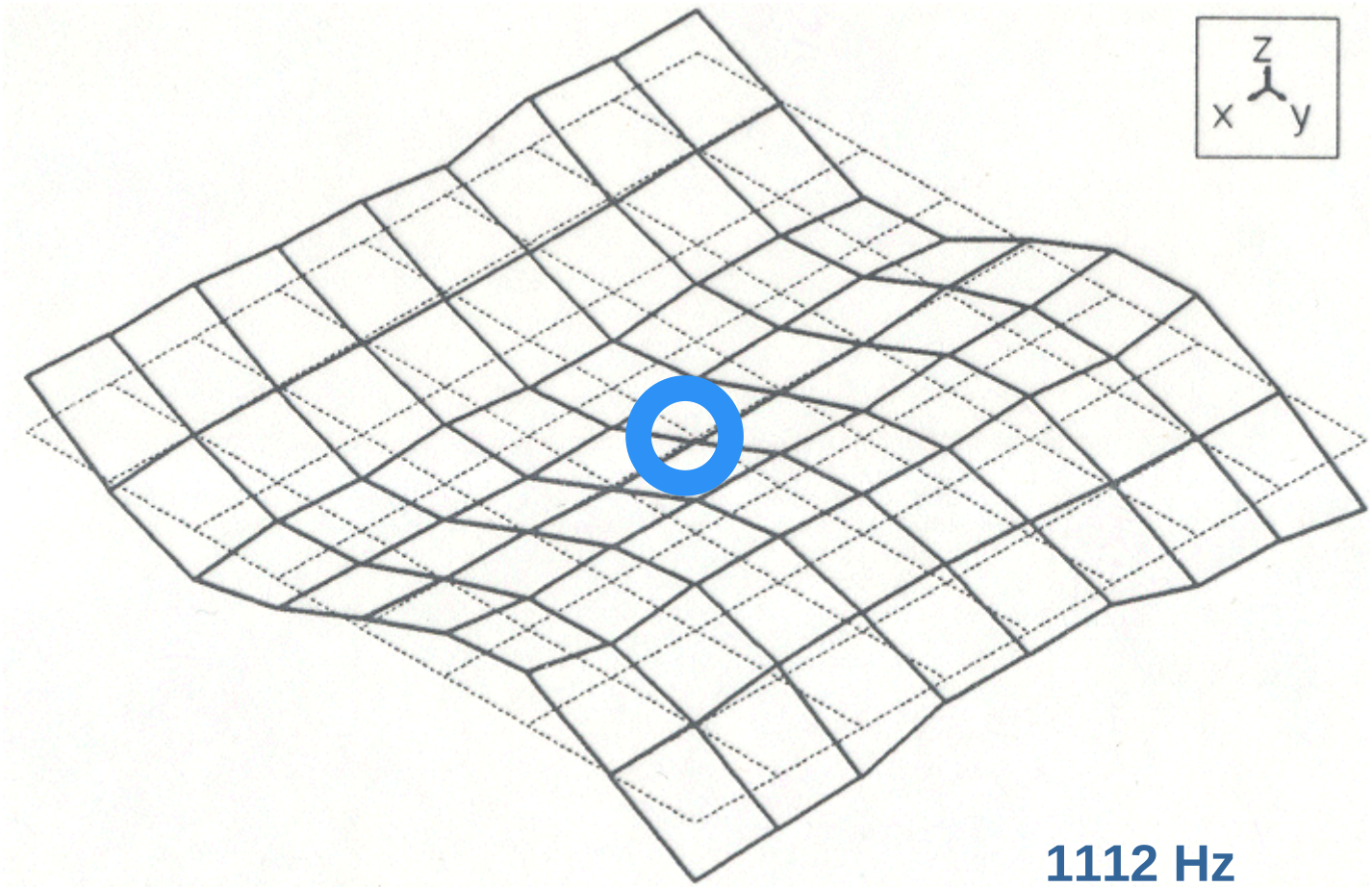
480 Hz

Modale analyse



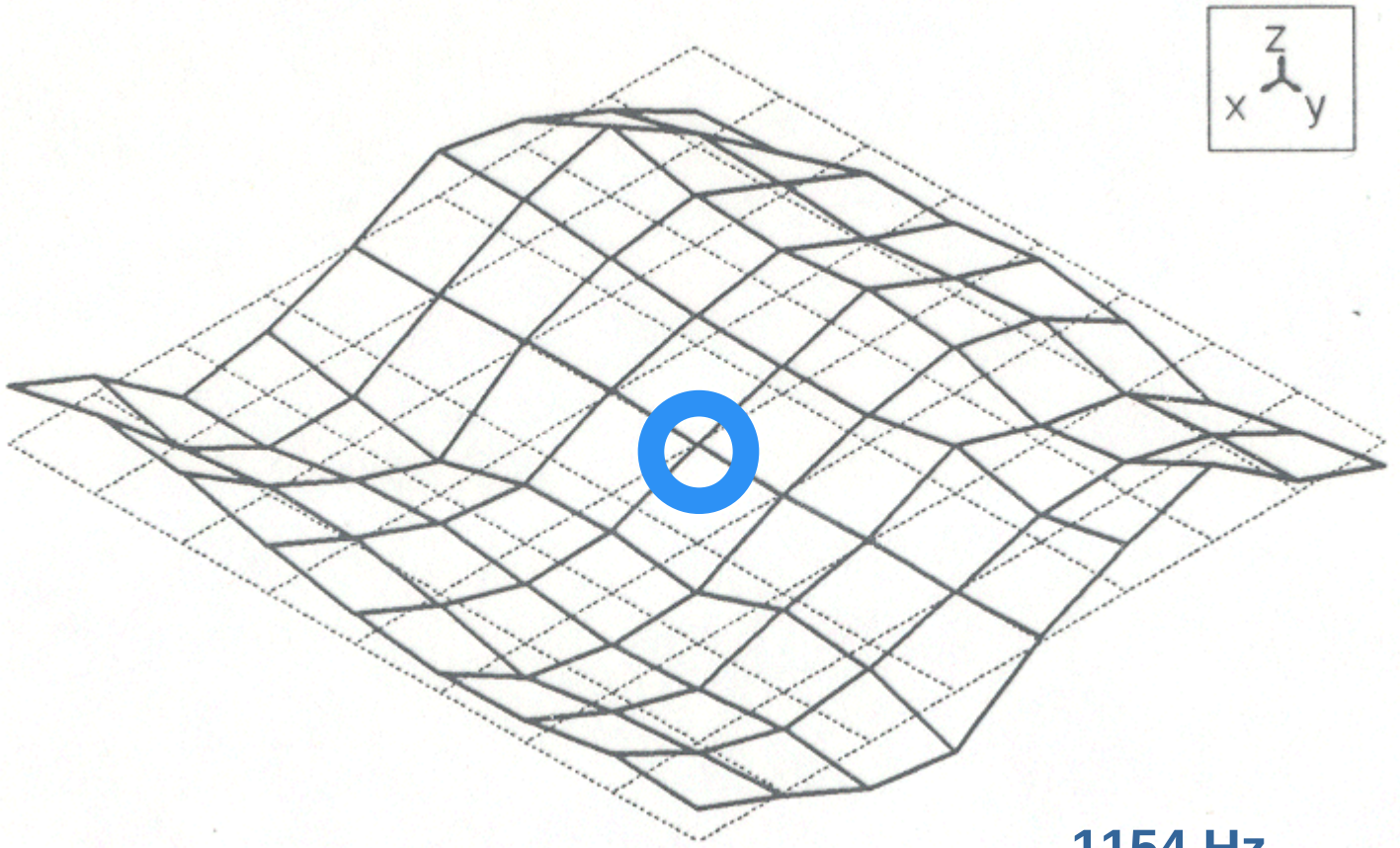
633 Hz

Modale analyse



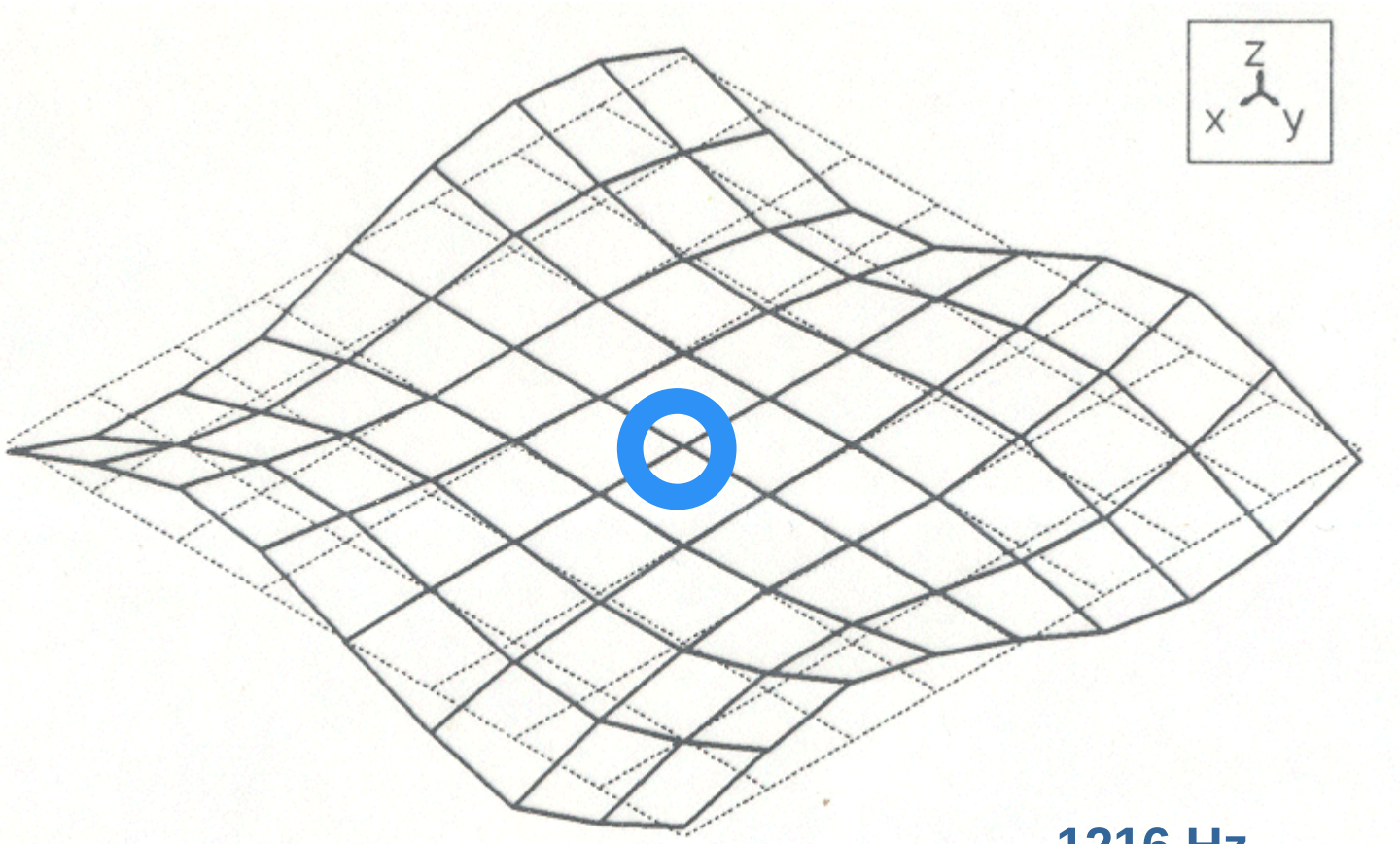
1112 Hz

Modale analyse



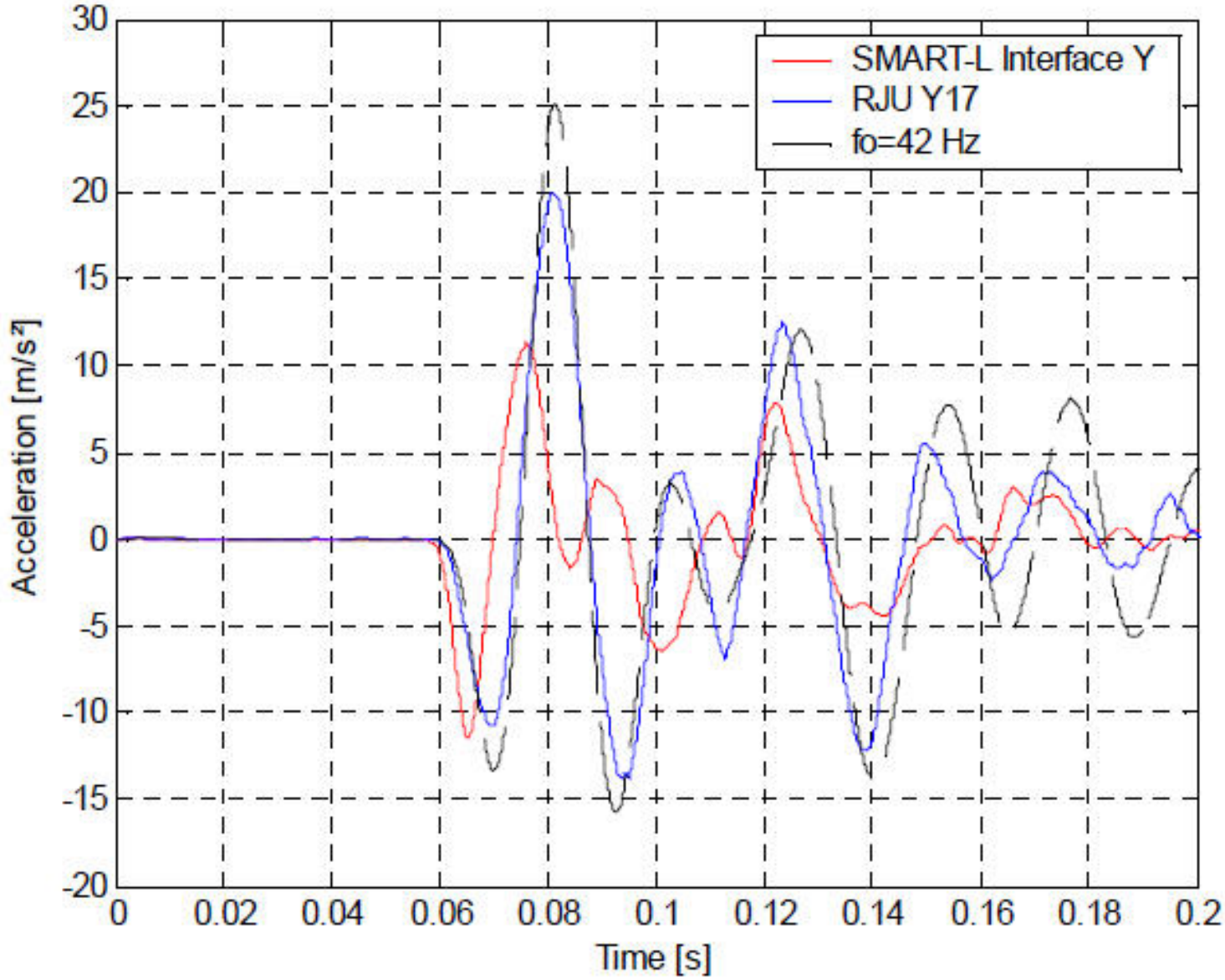
1154 Hz

Modale analyse



1216 Hz

TRANSFERFUNCTIE UIT EEN SCHOK



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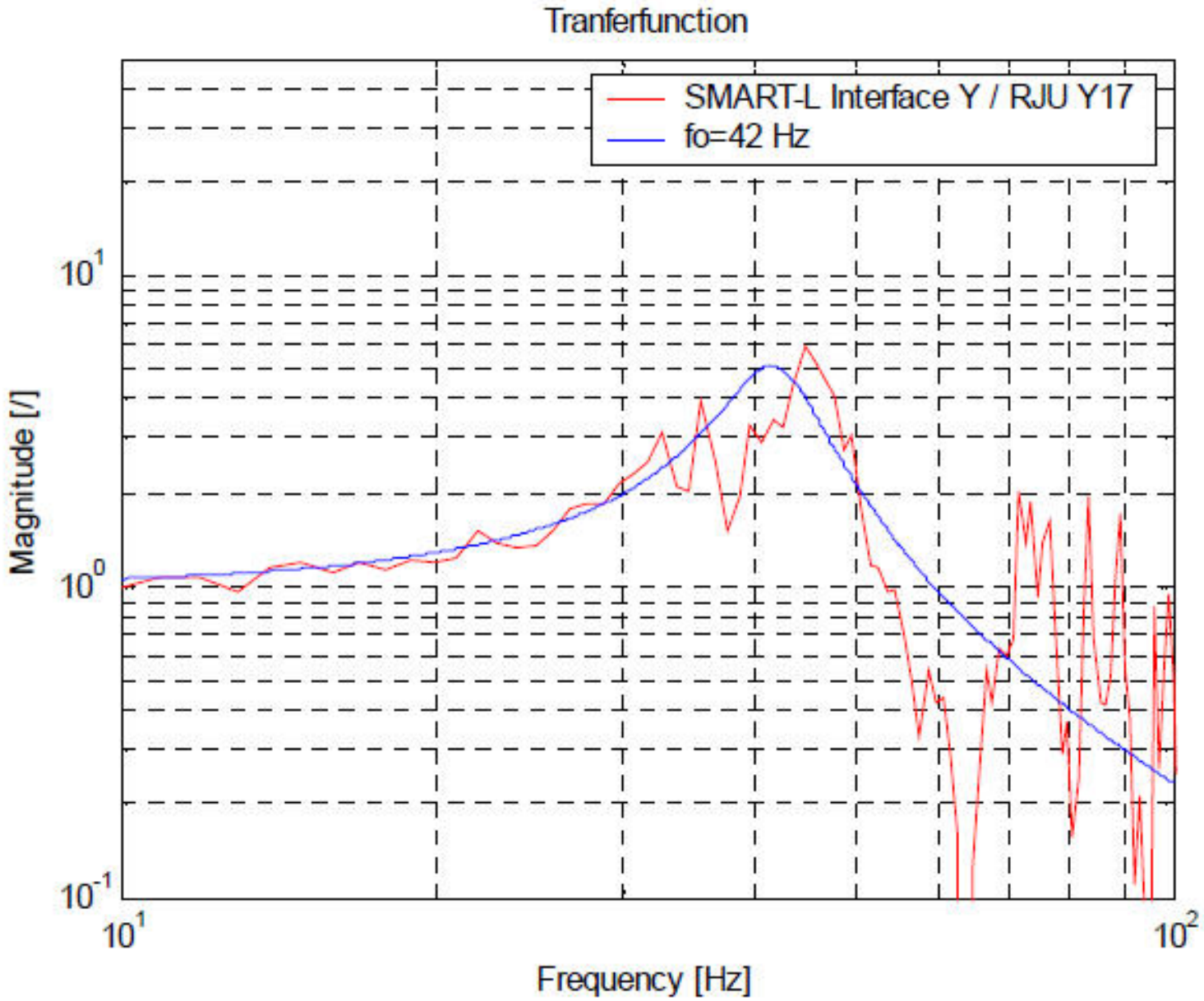

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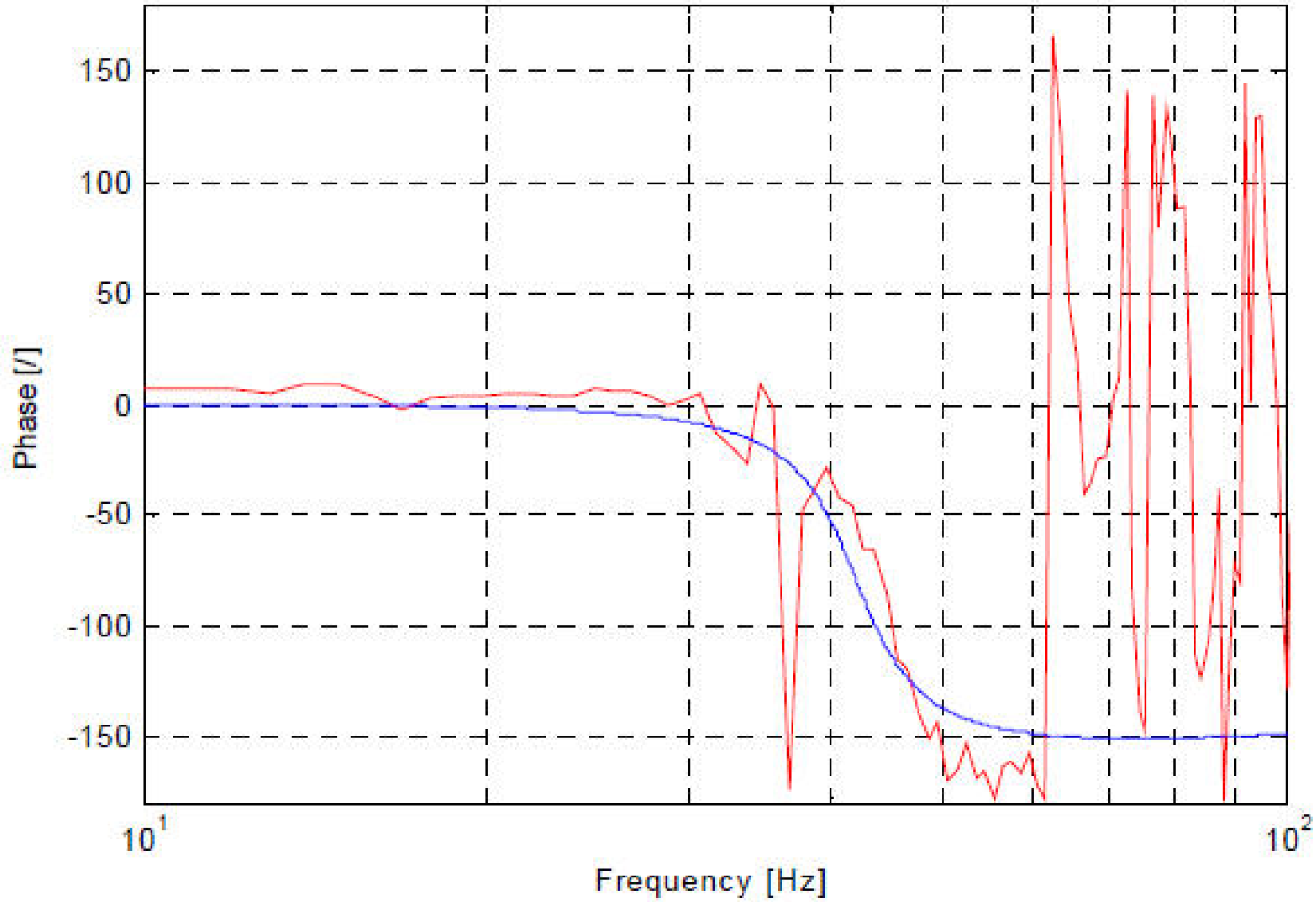

MASSA VAN DE OPNEMER EN BEINVLOEDING

Beinvloeding checken van:
- **De trilvorm**
- **De eigenfrequentie**
- **De Q-factor (de demping)**

Eventuele beinvloeding van het testresultaat
- **Materiaal spanningen**
- **Aantal wisselingen**

Tijdens de duurtest de opnemer niet verwijderen.