

3 SIME

3er Simposio de Ingeniería de Materiales y Estructuras

26 de Octubre de 2015, Bogotá, Colombia

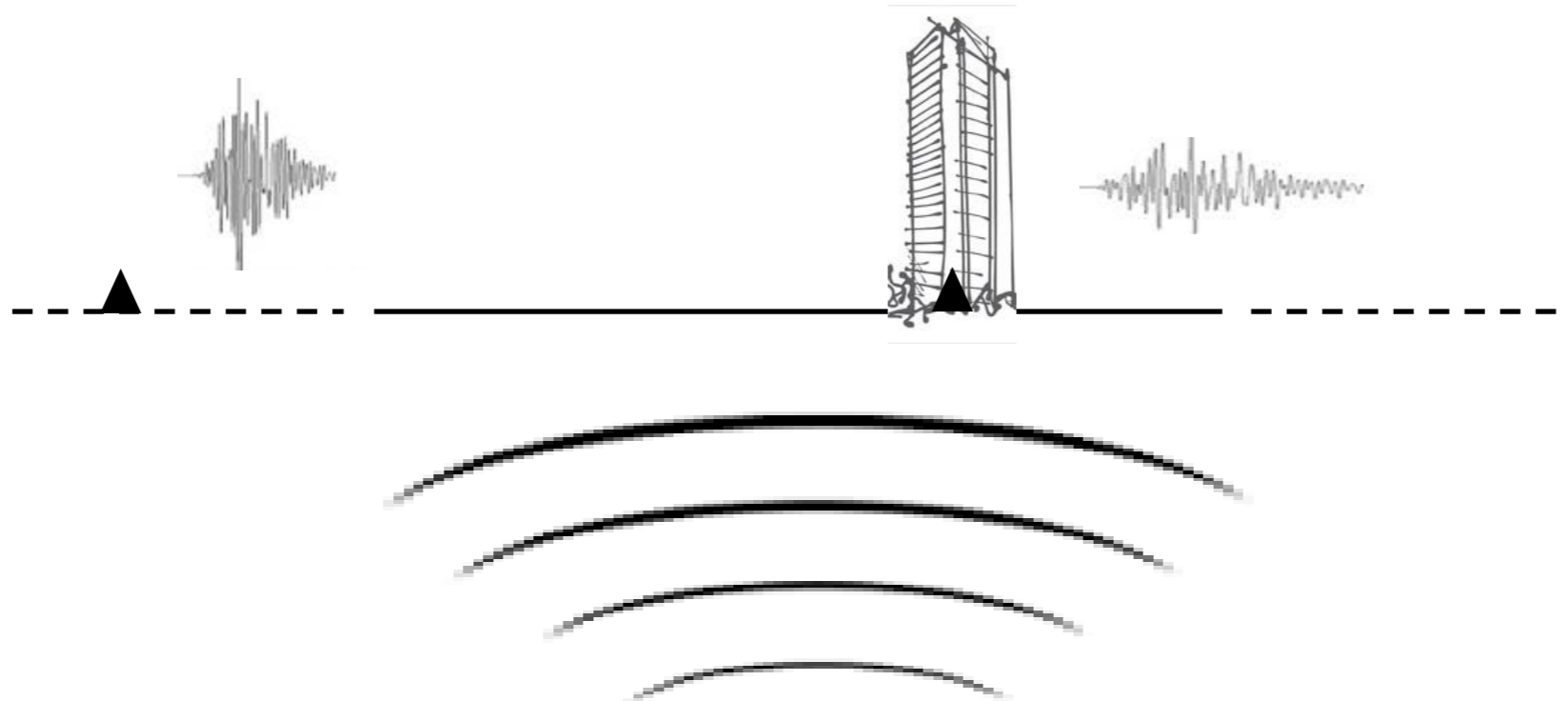
UN PROCEDIMIENTO SIMPLE PARA CONSIDERAR EFECTOS DE INTERACCIÓN SUELO-ESTRUCTURA

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(jjarami@eafit.edu.co)

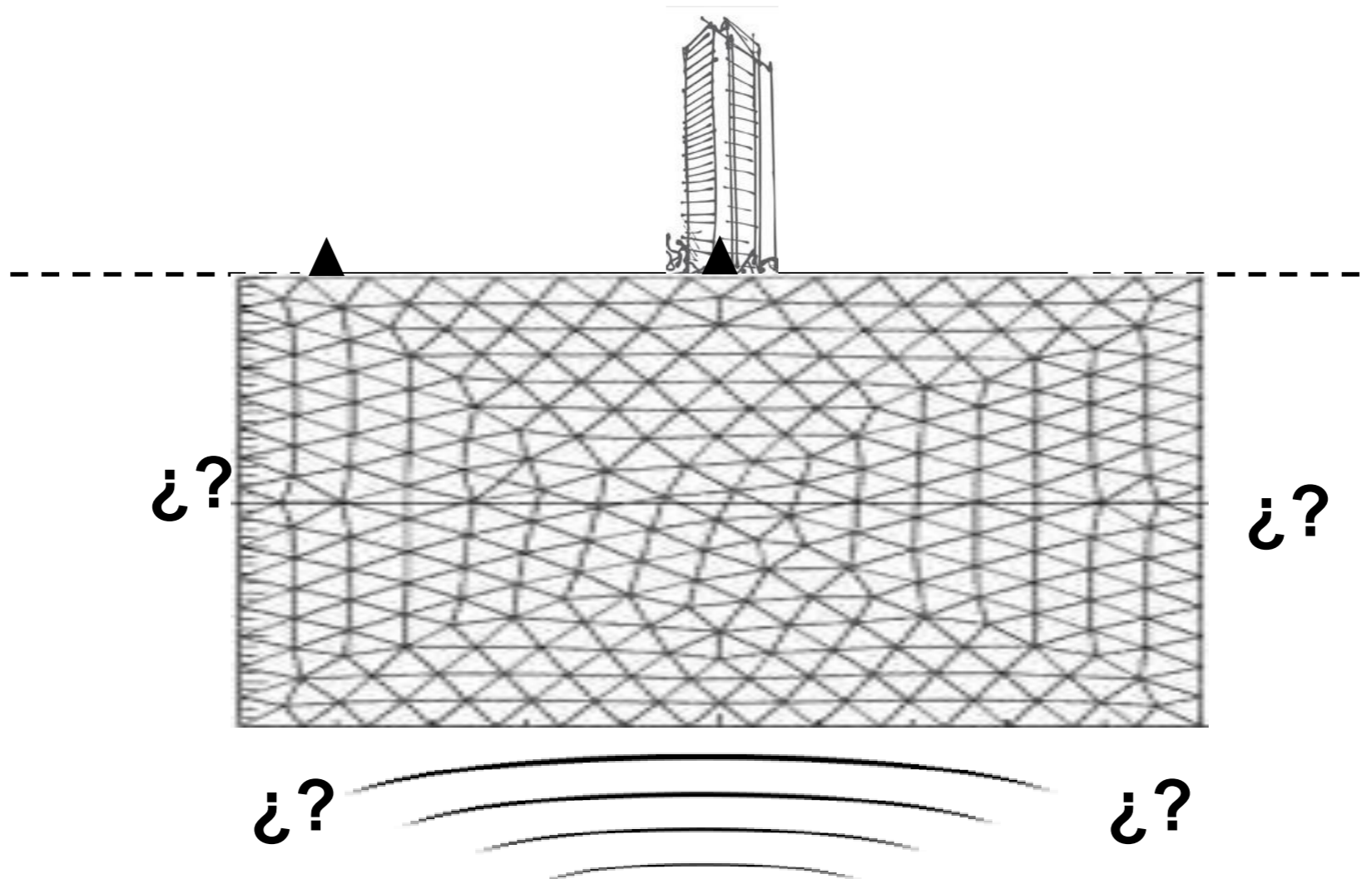
MECÁNICA APLICADA
ESCUELA DE INGENIERÍA
UNIVERSIDAD EAFIT



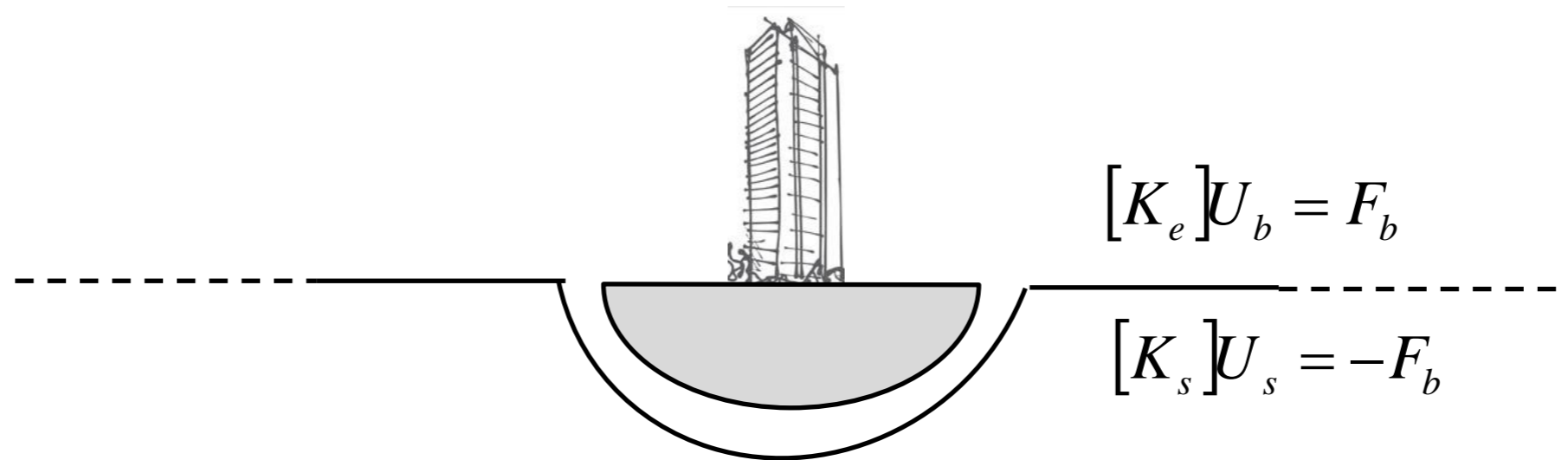
FENÓMENO ISE



¿CÓMO CALCULARLO?



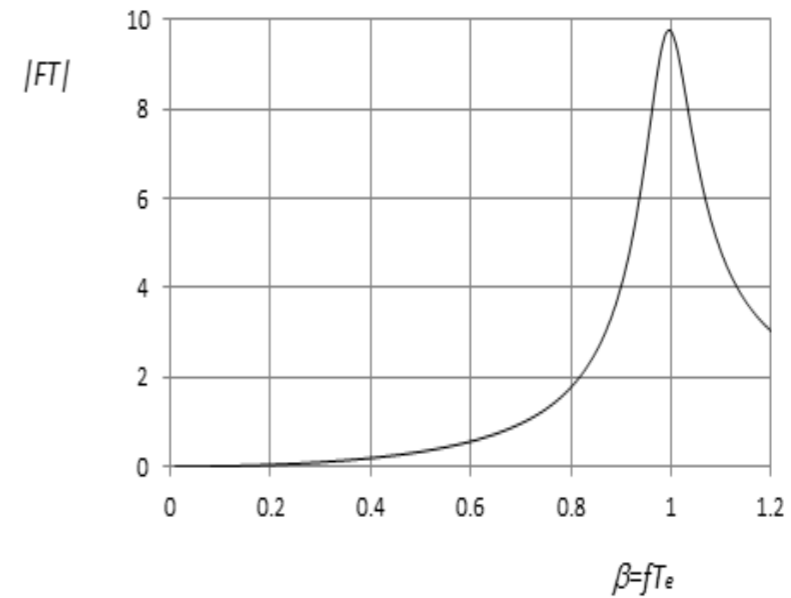
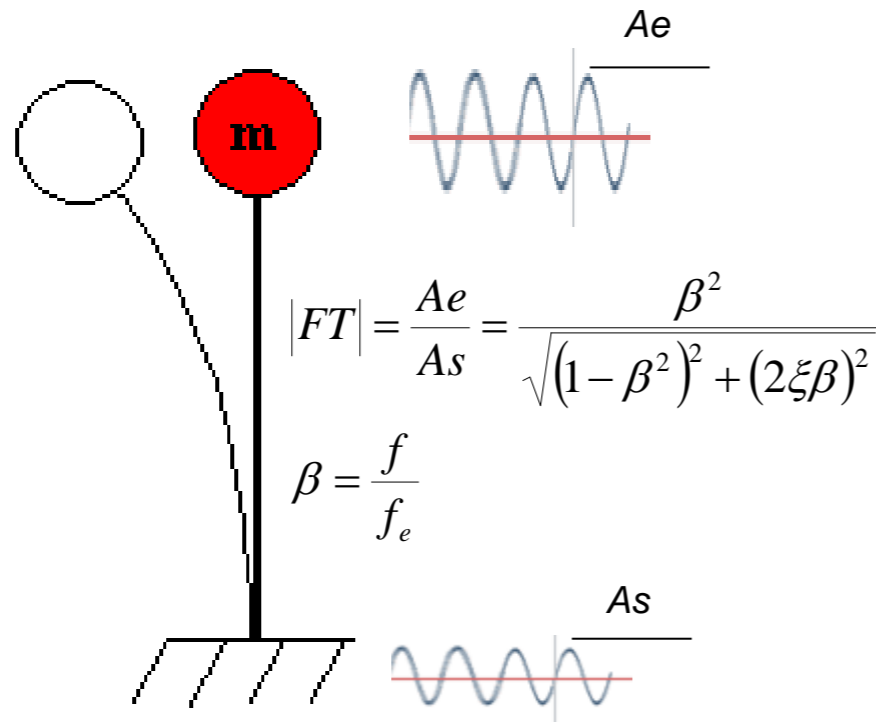
SUPERPOSICIÓN



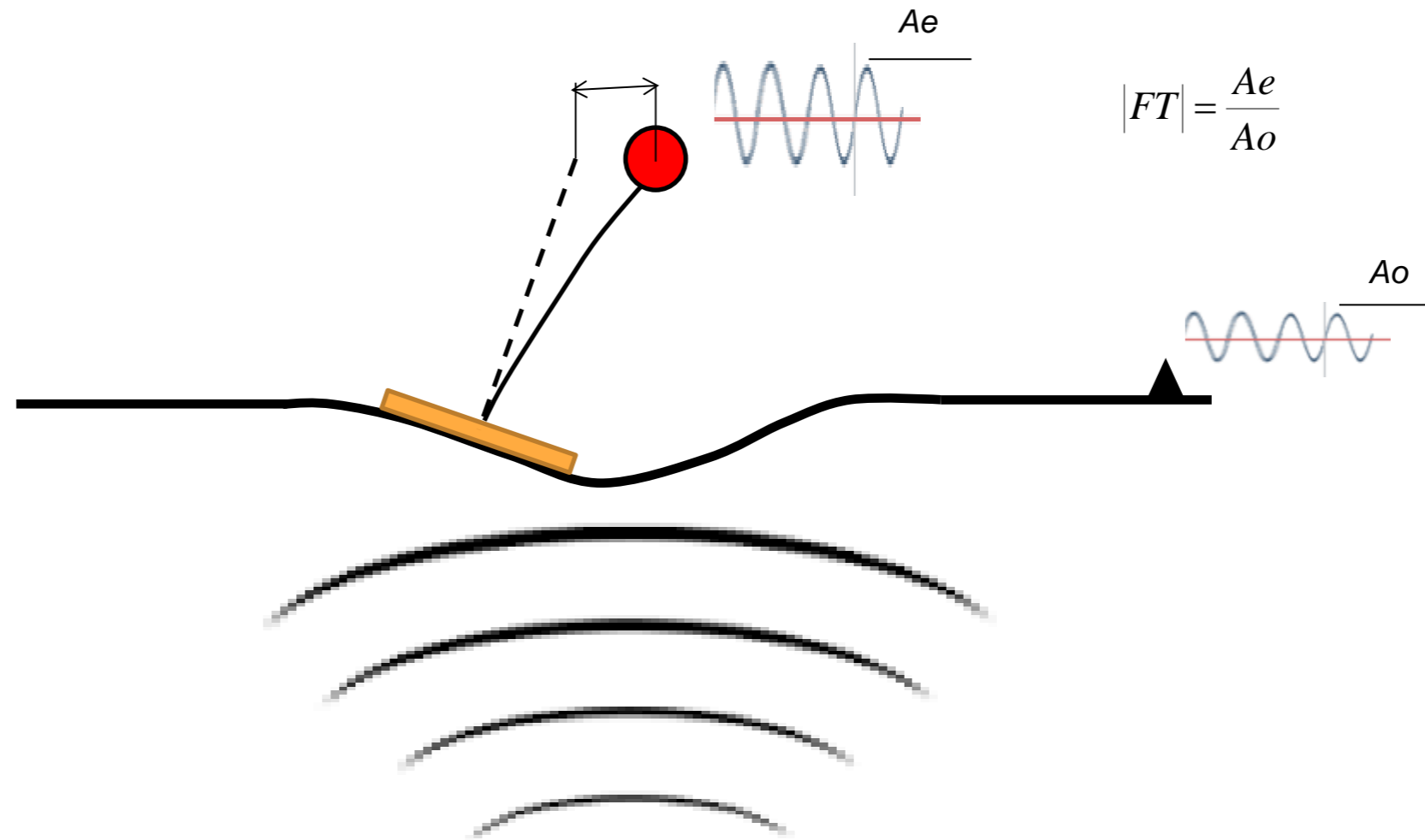
$$U_s + U_0 = U_b$$

$$\{[K_s] + [K_e]\}U_b = [K_s]U_0 = F_0$$

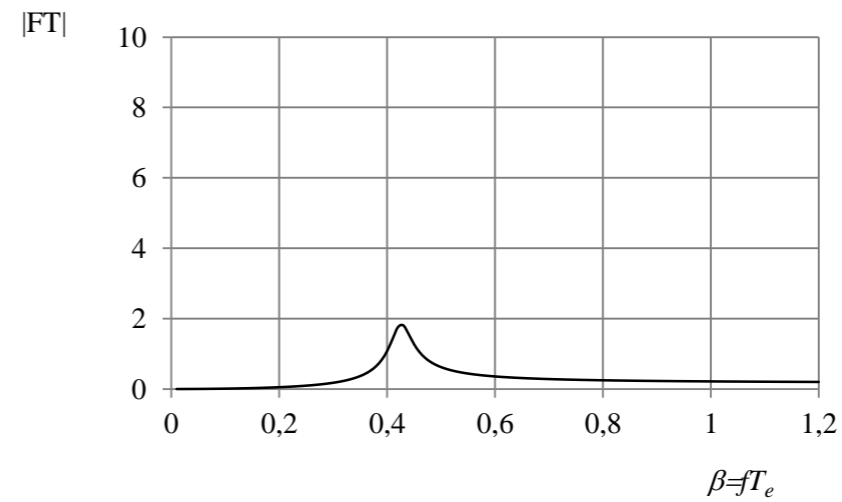
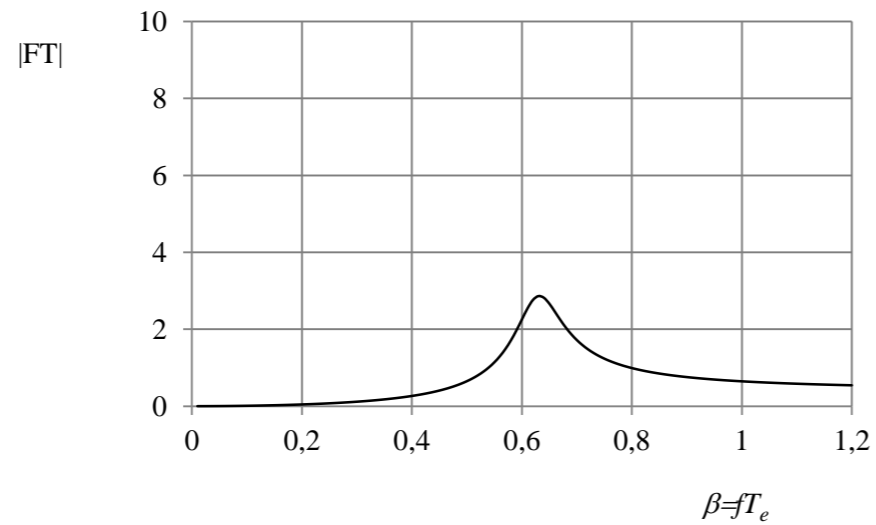
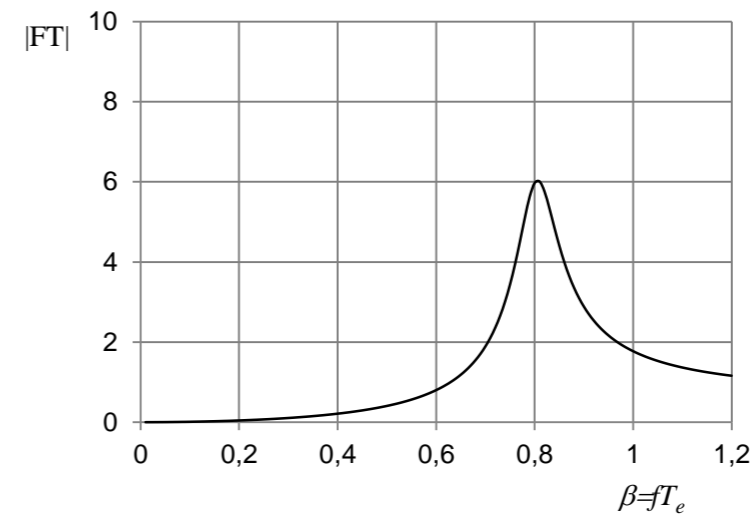
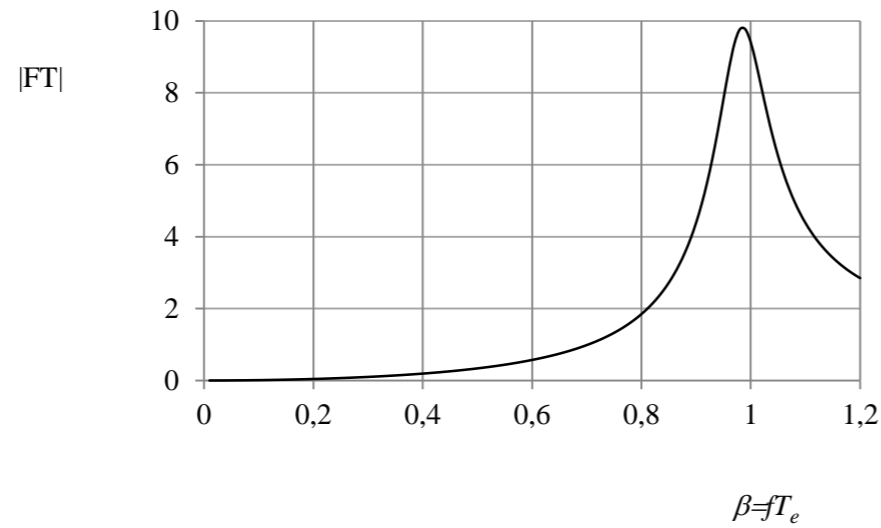
FUNCIÓN DE TRANSFERENCIA



FUNCIÓN DE TRANSFERENCIA ISE



FUNCIÓN DE TRANSFERENCIA ISE

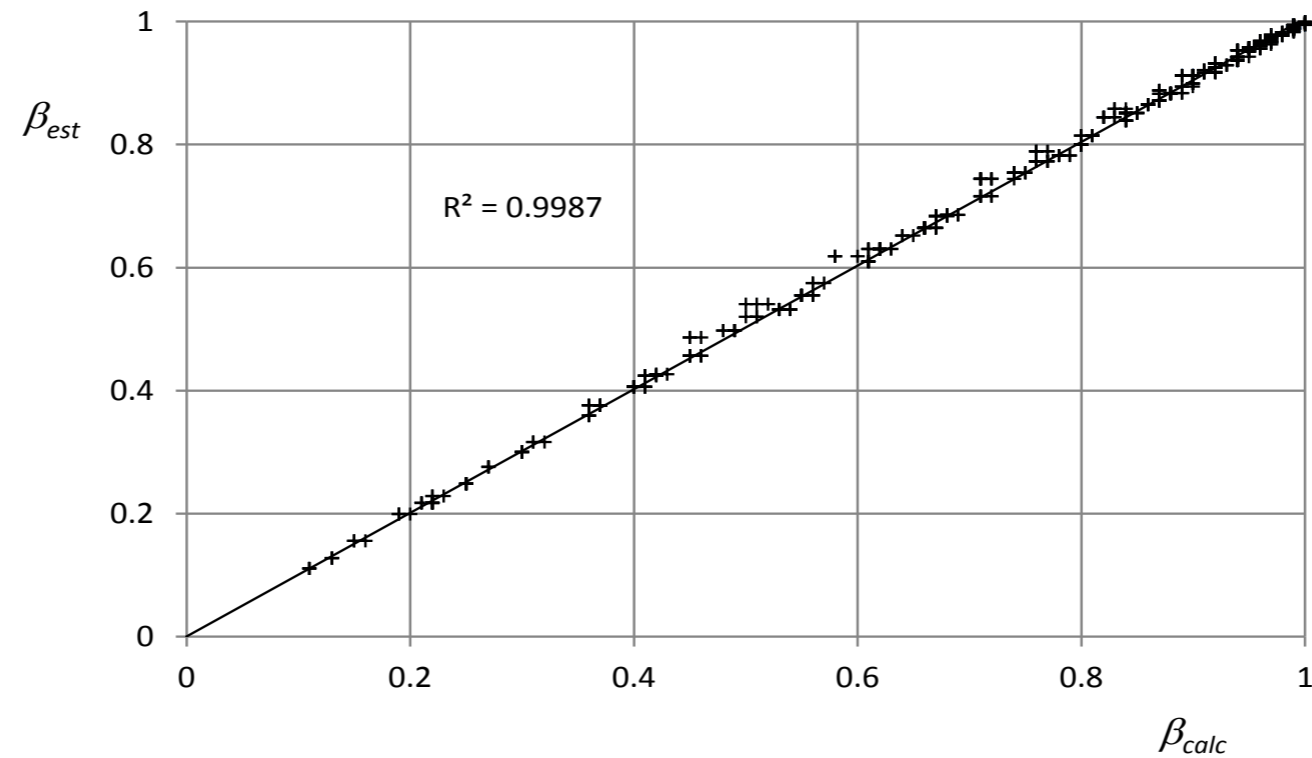


$$\beta = \frac{1}{\sqrt{1 + \frac{K_e}{G_s} \left[\alpha_{\beta 1} + \alpha_{\beta 2} \left(\frac{H_e}{B} \right)^2 \right]}}$$

$$\alpha_{\beta 1} = 0.1565$$

$$\alpha_{\beta 2} = 1.8422$$

2D

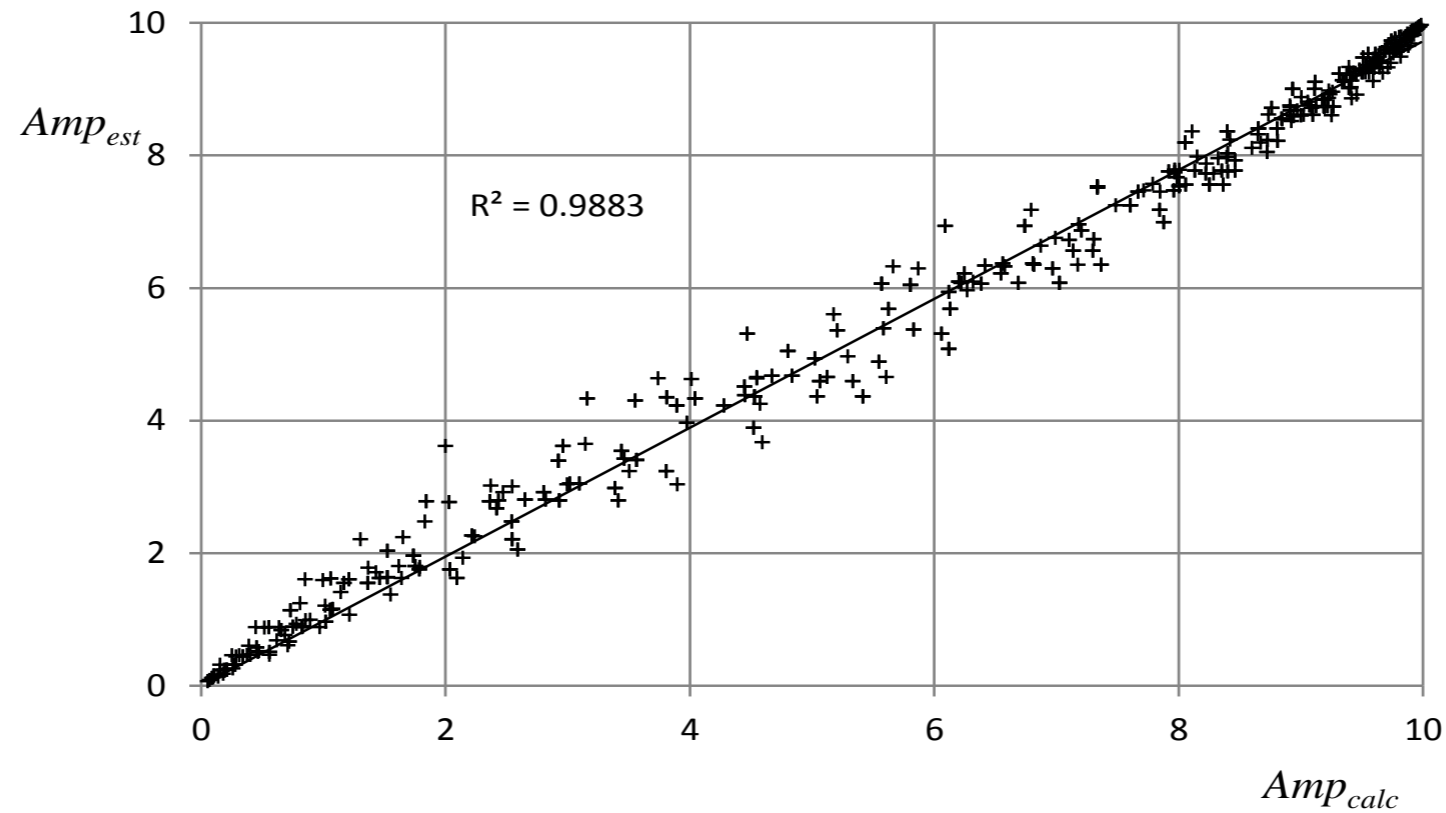


$$A_{\max} = \frac{1}{2\xi_e \left\{ 1 + \left(\frac{K_e}{G_s} \right) \left[\alpha_{A1} + \alpha_{A2} \xi_s \left(\frac{H_e}{B} \right) \right] \right\}}$$

$$\alpha_{A1} = 0.1493$$

$$\alpha_{A2} = 104.0314$$

2D

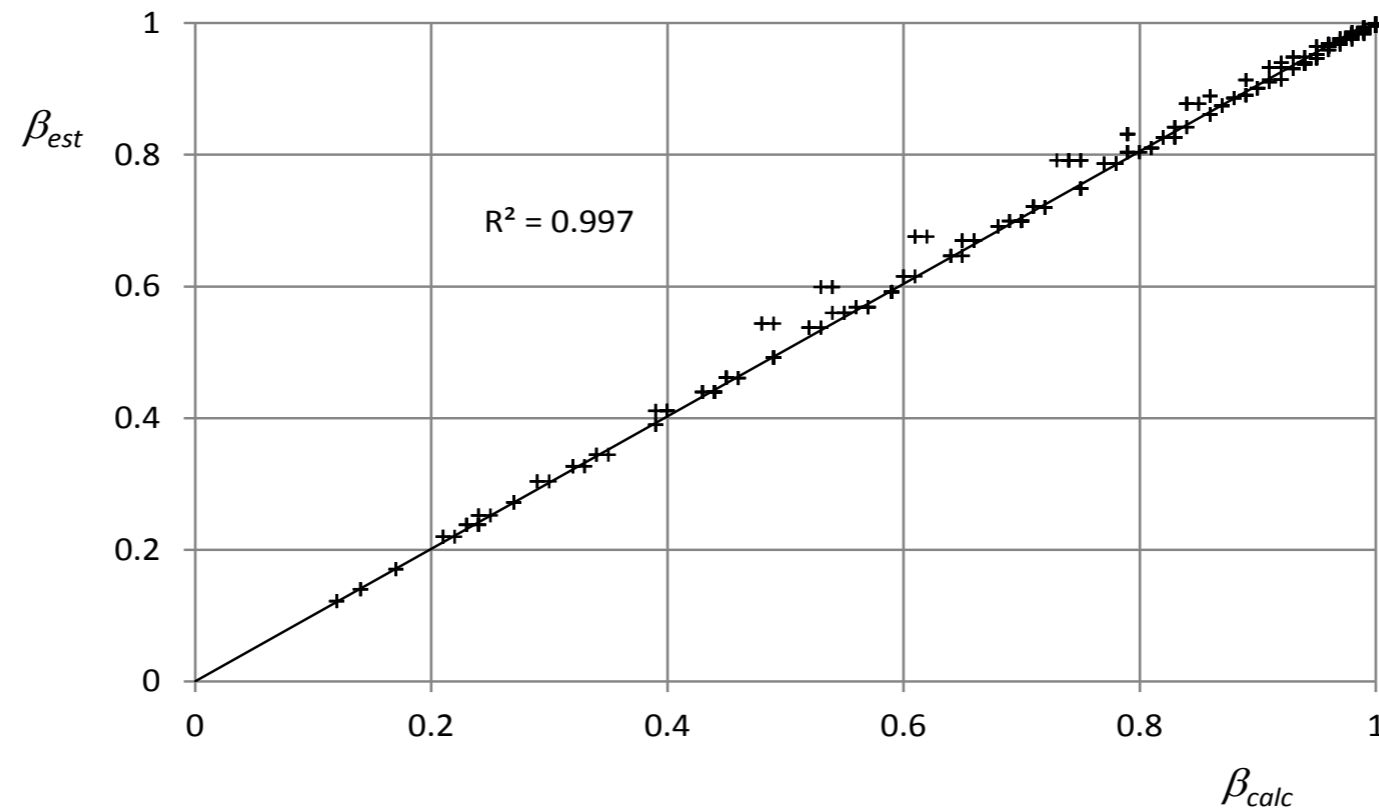


$$\beta = \frac{1}{\sqrt{1 + \frac{K_e}{G_s B} \left[\alpha_{\beta 1} + \alpha_{\beta 2} \left(\frac{H_e}{B} \right)^2 \right]}}$$

$$\alpha_{\beta 1} = -0.0648$$

$$\alpha_{\beta 2} = 1.5417$$

3D

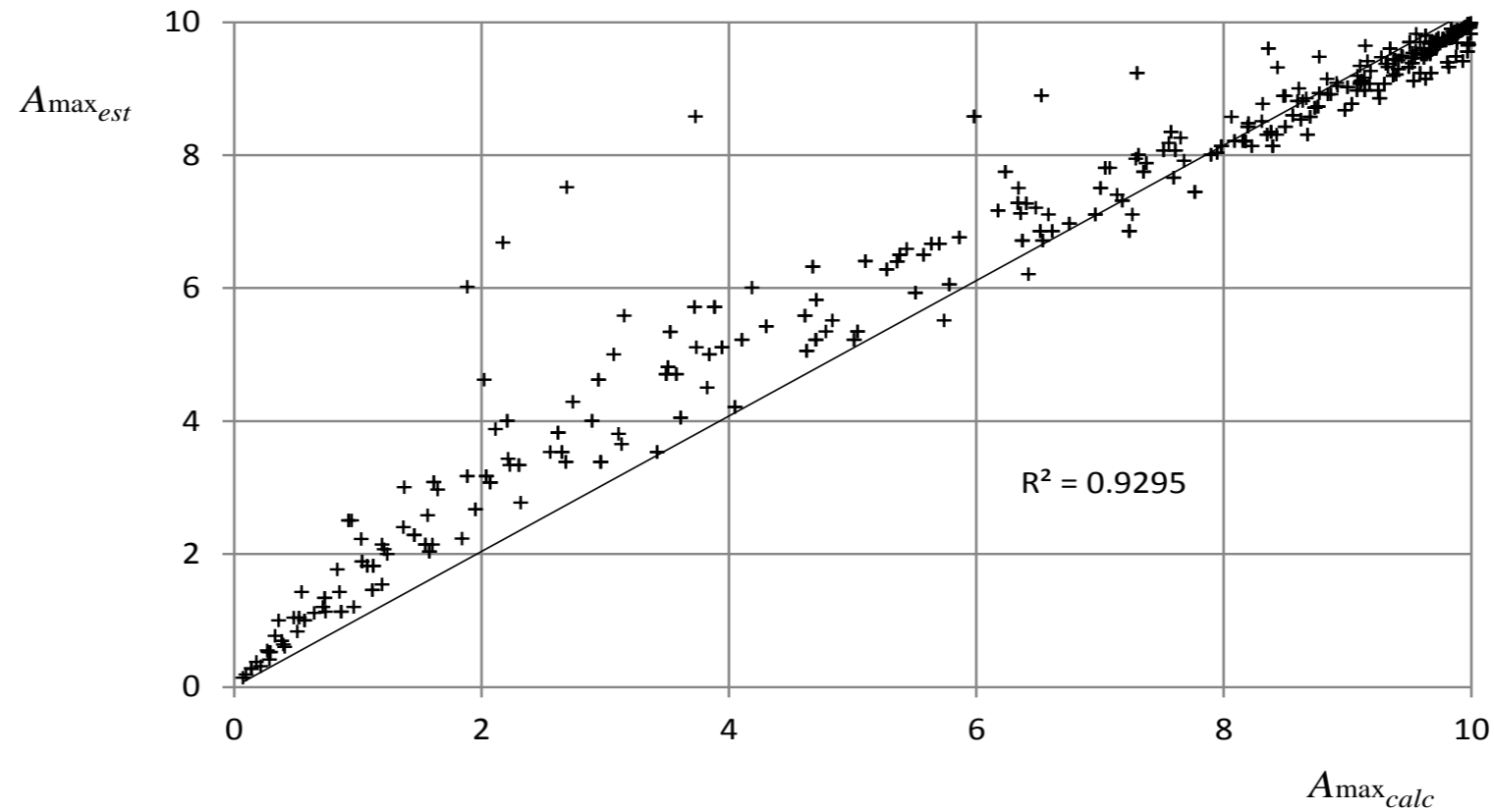


$$A_{\max} = \frac{1}{2\xi_e \left\{ 1 + \left(\frac{K_e}{G_s B} \right) \left[\alpha_{A1} + \alpha_{A2} \xi_s \left(\frac{H_e}{B} \right) \right] \right\}}$$

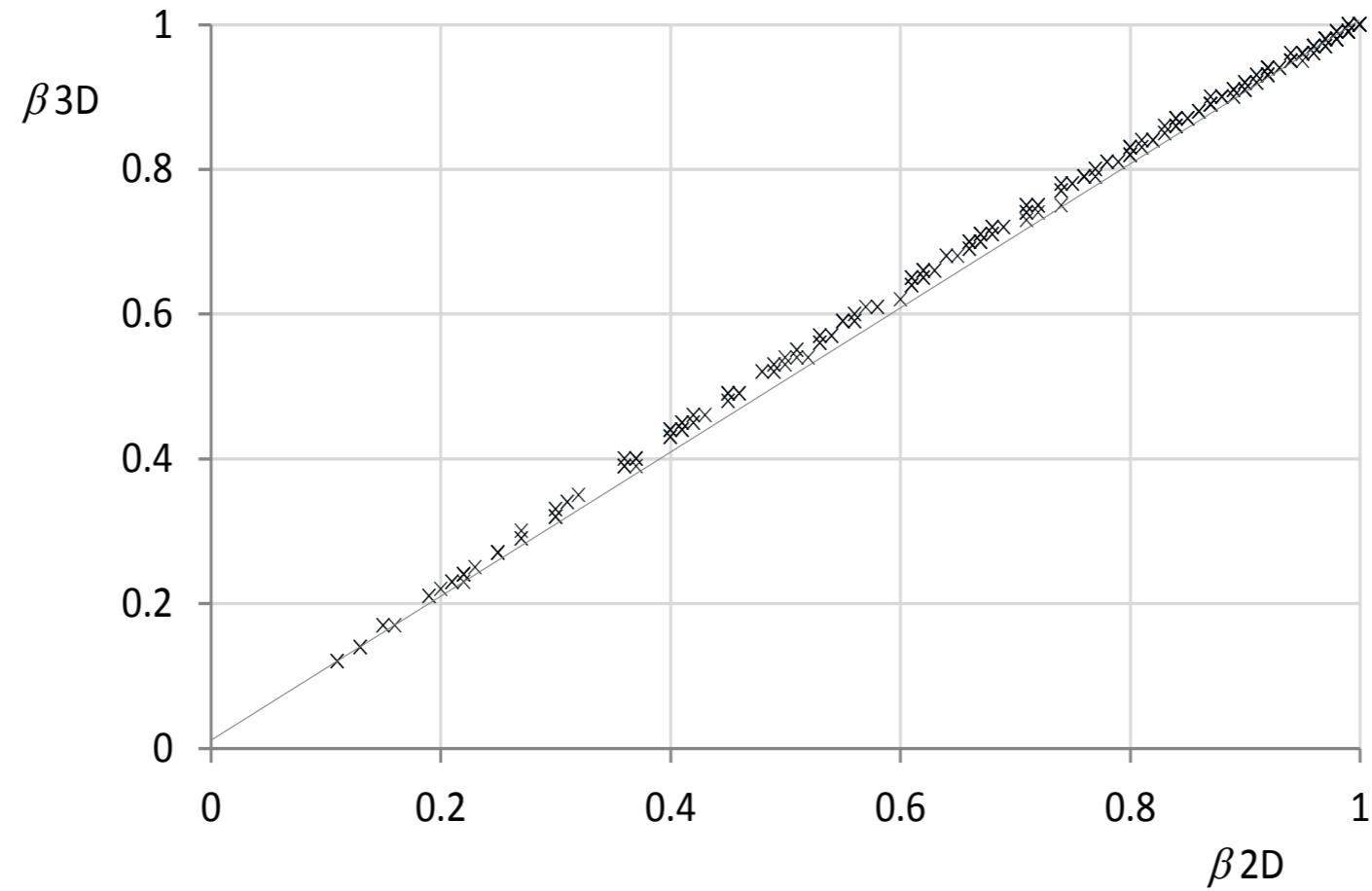
$$\alpha_{A1} = -2.5932$$

$$\alpha_{A2} = 82.7809$$

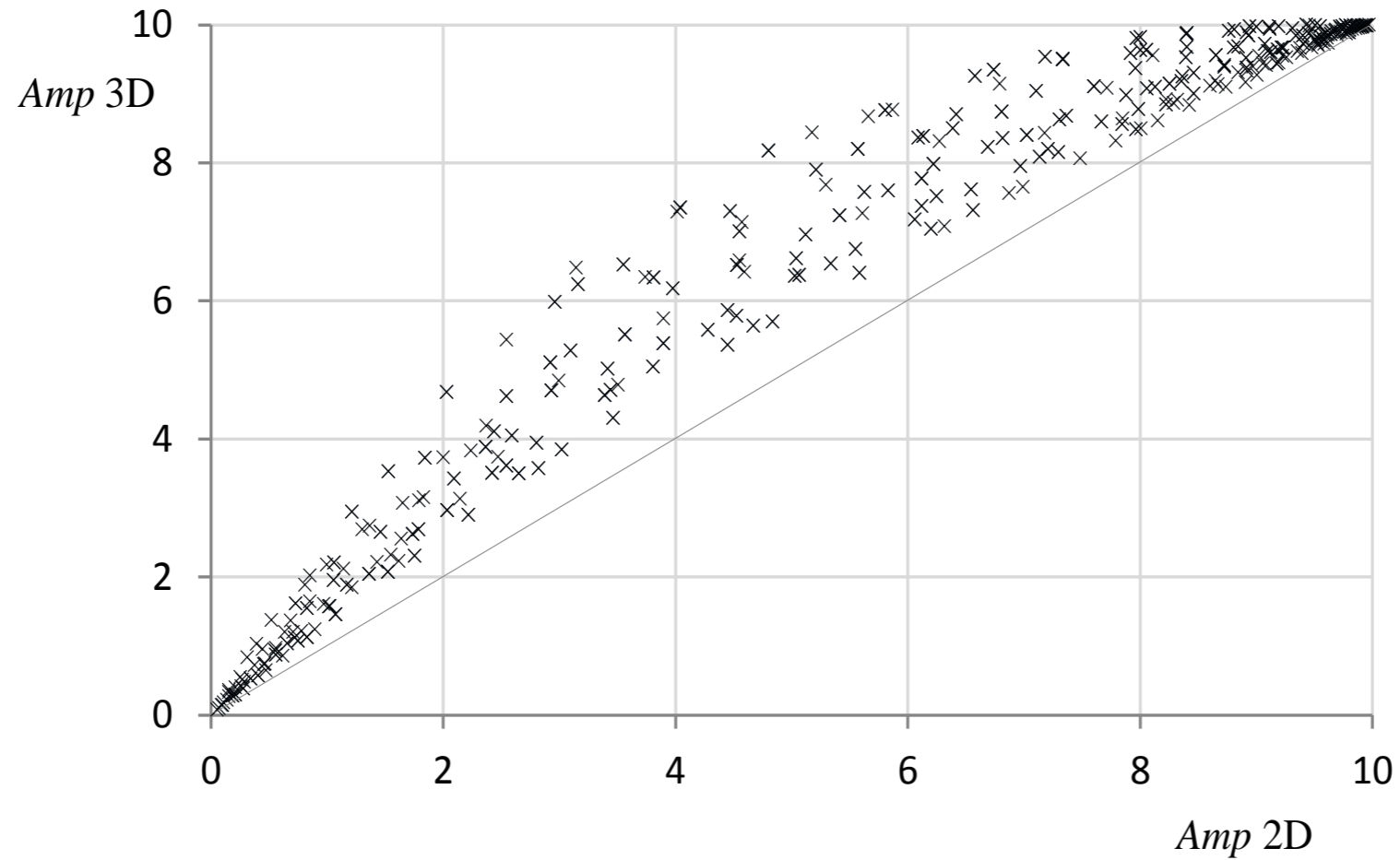
3D



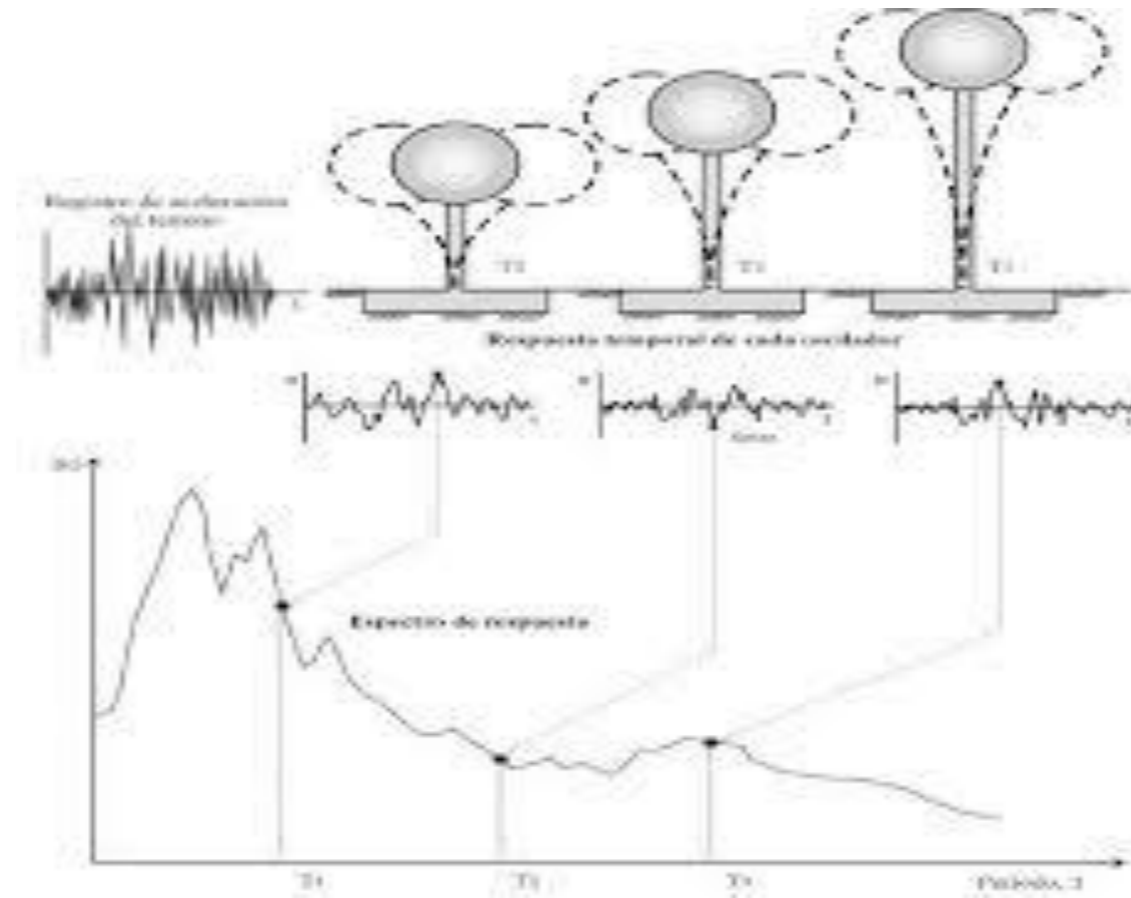
2D vs 3D



2D vs 3D

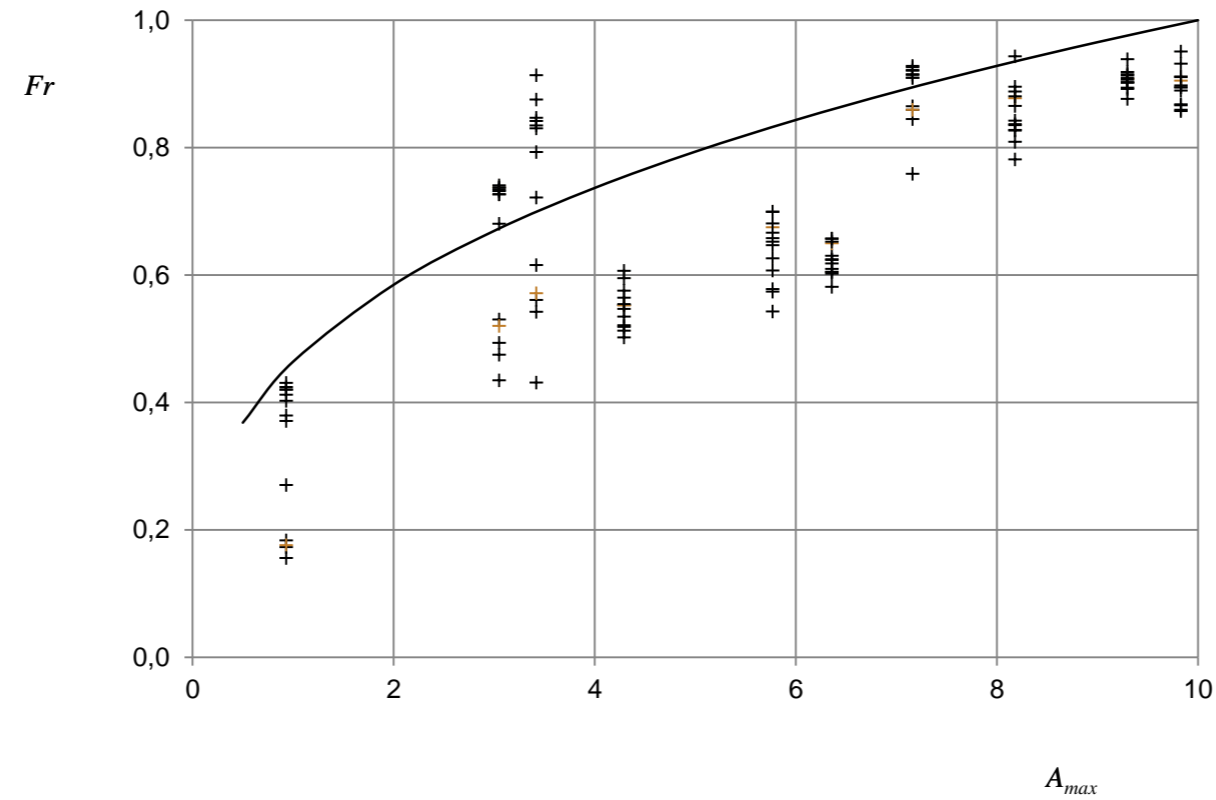


RESPUESTA SÍSMICA CON INTERACCIÓN

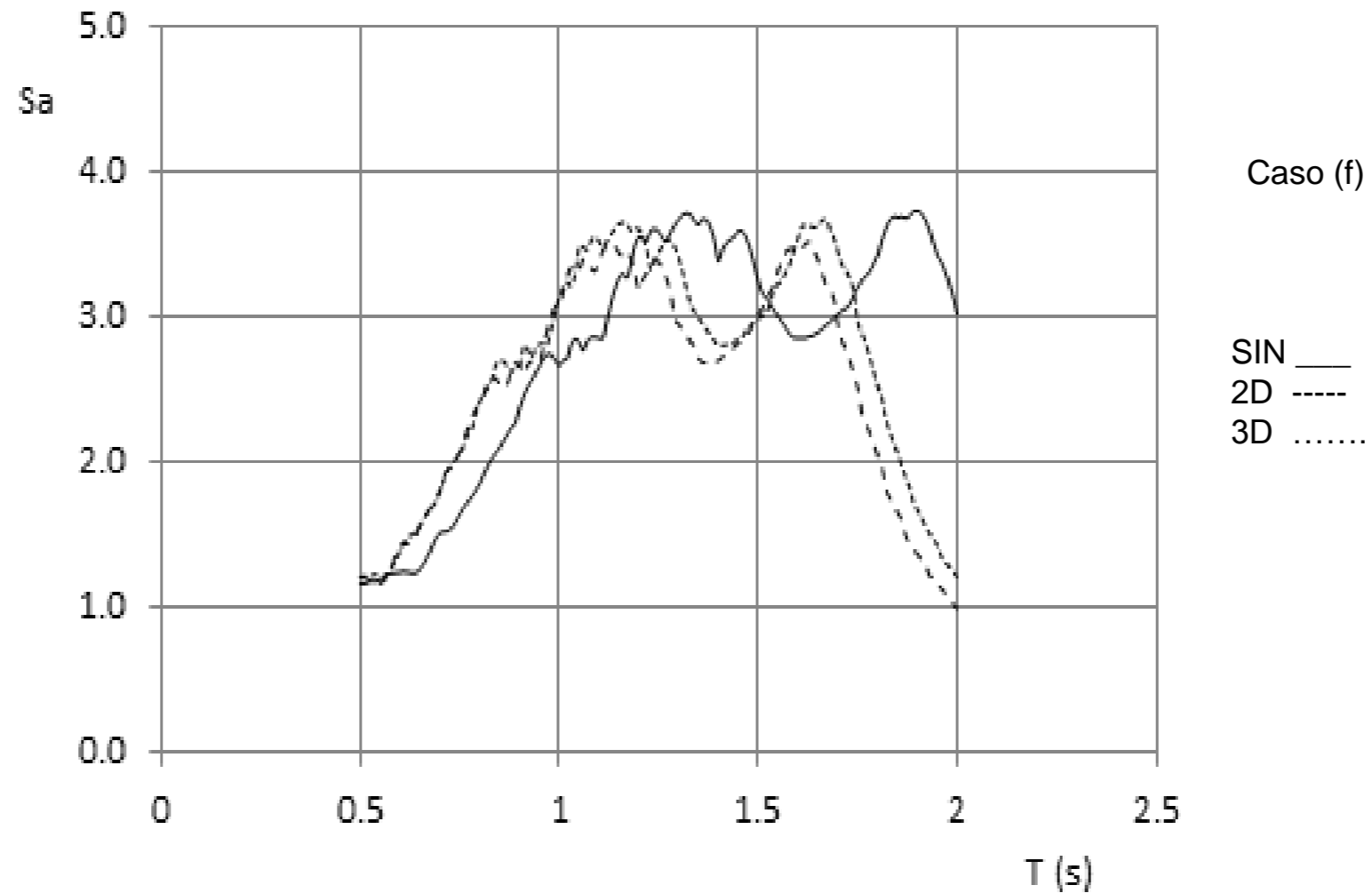


RESPUESTA SÍSMICA CON INTERACCIÓN

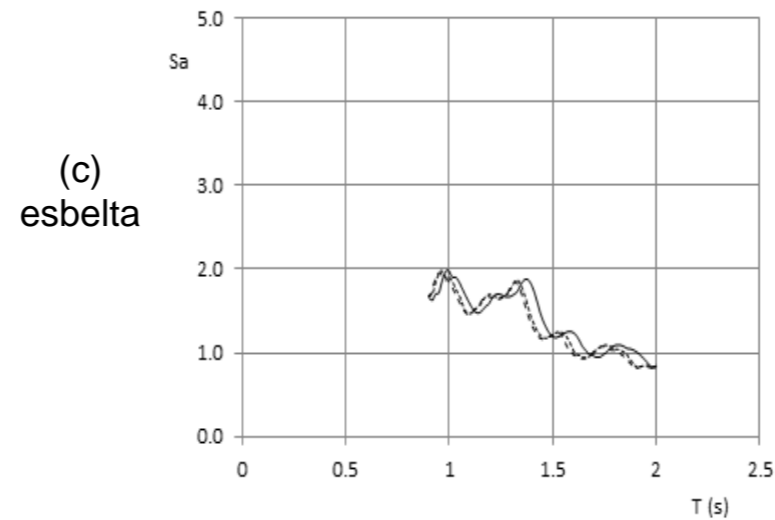
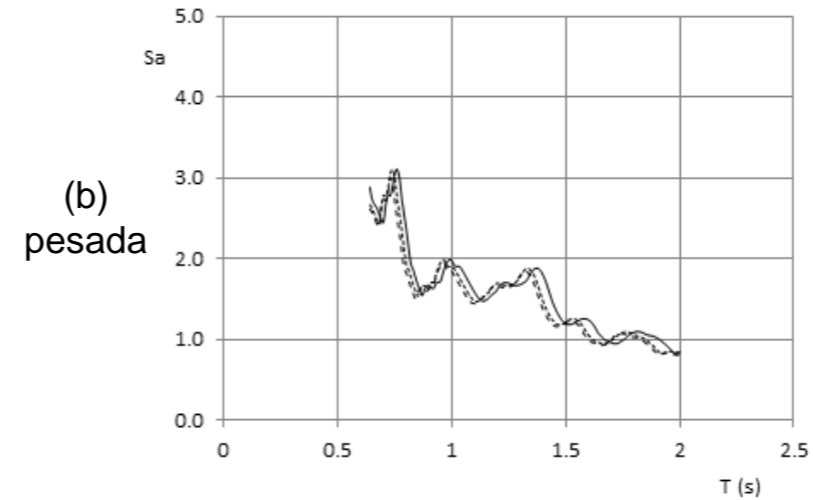
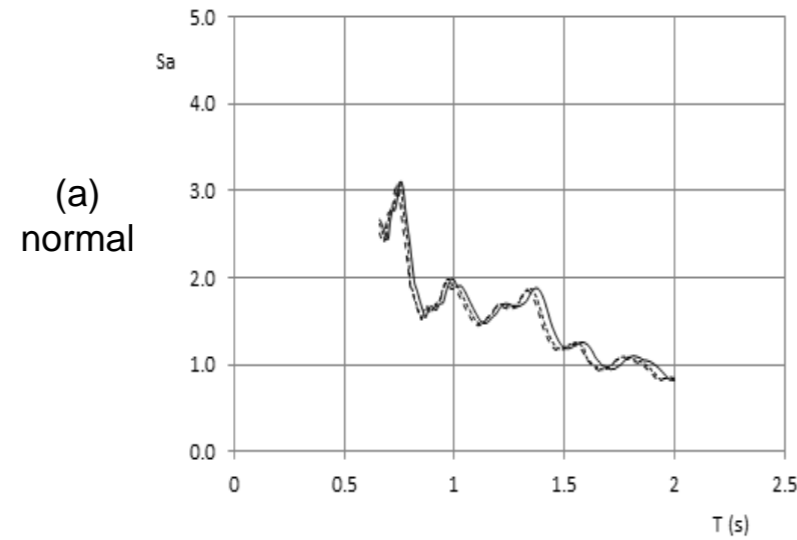
$$Fr = (2\xi_{Sa} A_{max})^{1/3}$$



RESPUESTA SÍSMICA CON INTERACCIÓN



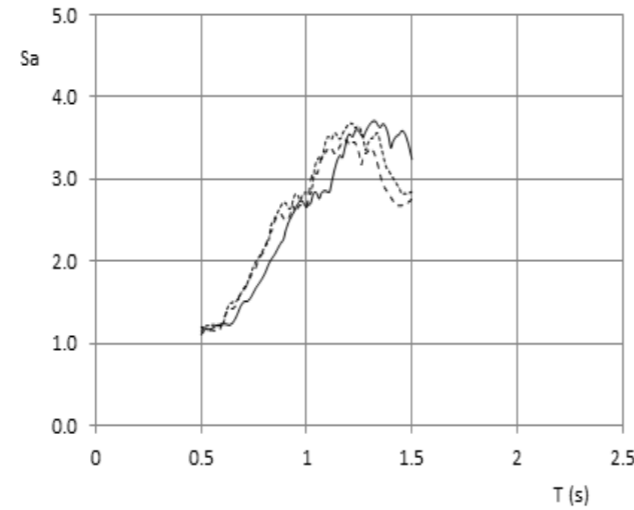
RESPUESTA SÍSMICA CON INTERACCIÓN



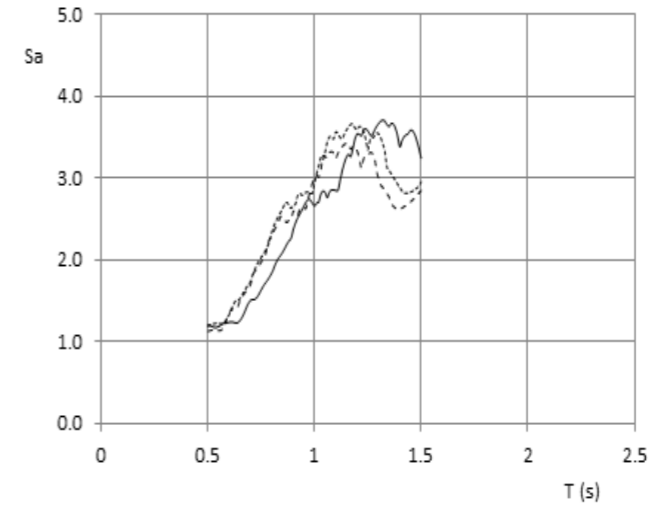
Suelo blando

RESPUESTA SÍSMICA CON INTERACCIÓN

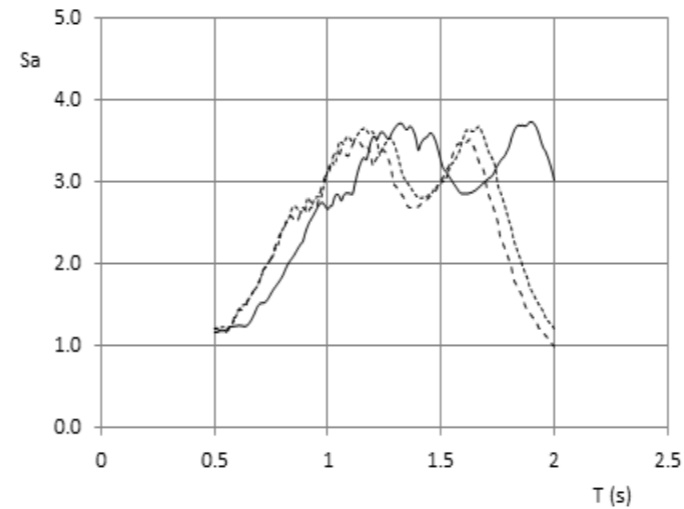
(d)
normal



(e)
pesada



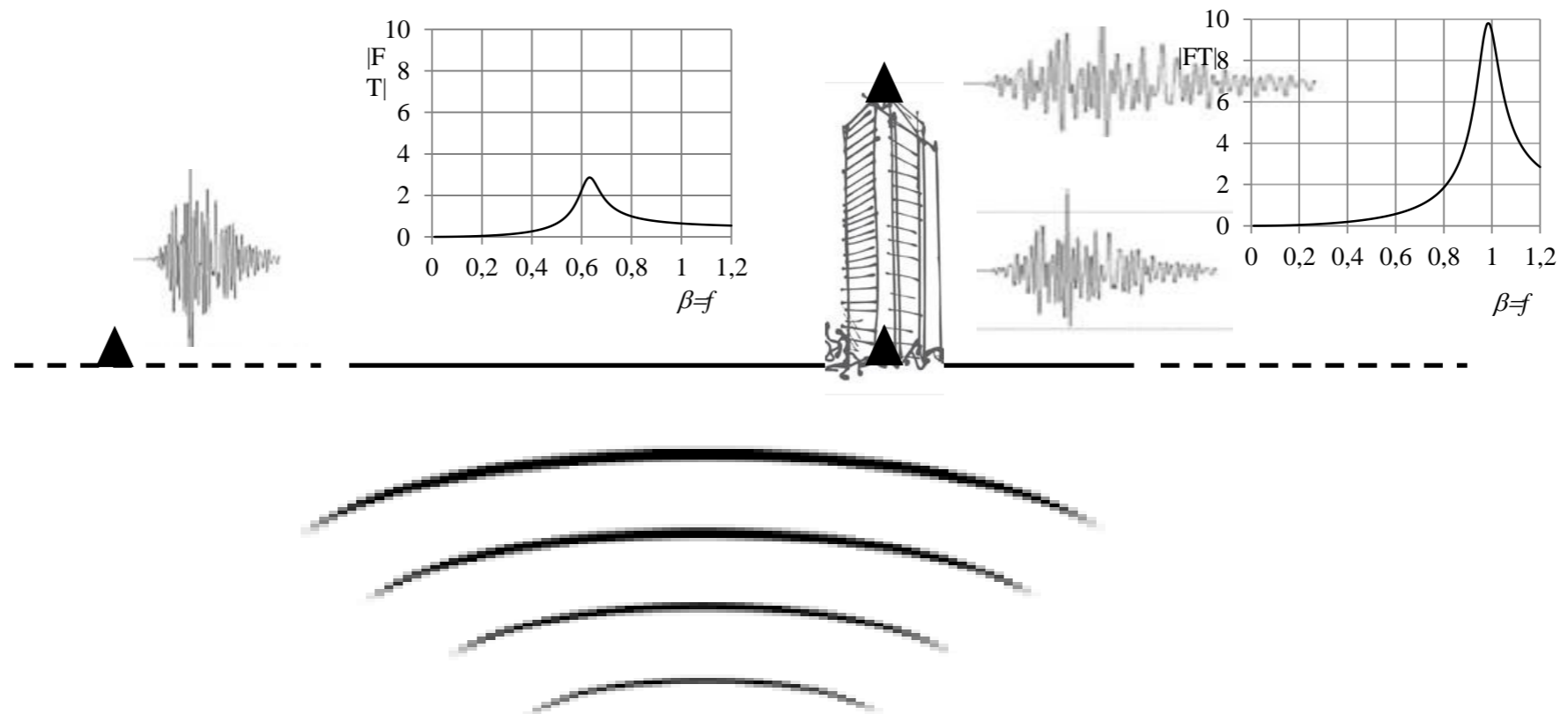
(f)
esbelta



Suelo firme

SIN ____
2D ----
3D

IDENTIFICACIÓN DE FENÓMENOS ISE EN EDIFICIOS INSTRUMENTADOS



REFERENCIAS

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MUCHAS GRACIAS

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