

Comsol 2010 Conference, Boston, MA

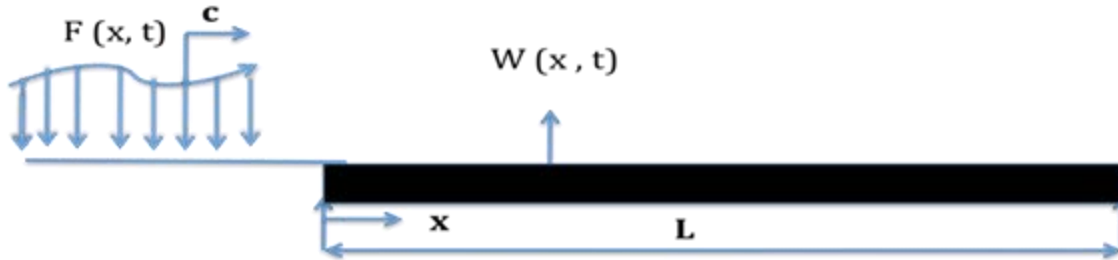
Beam structure as an acoustic wave sensor: a study of the effect of sensor design on its sensitivity to noise

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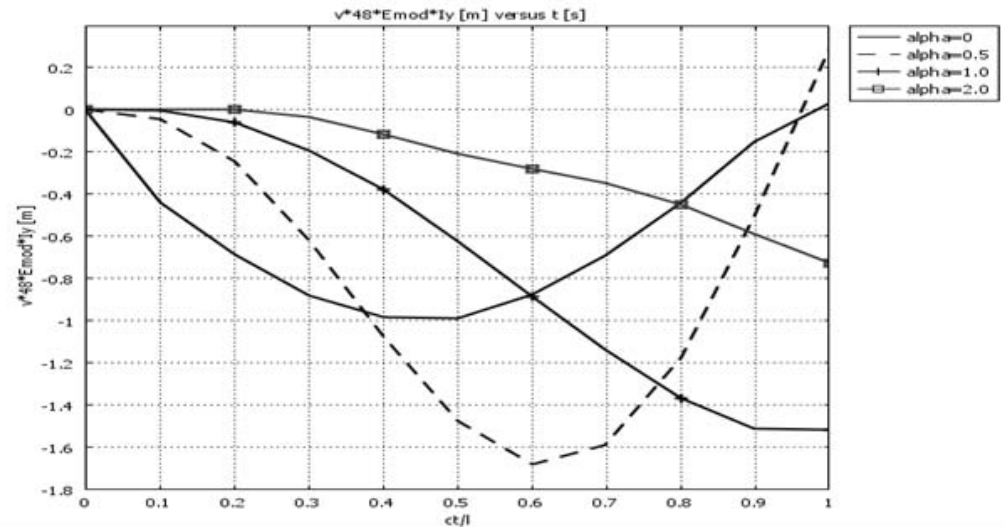
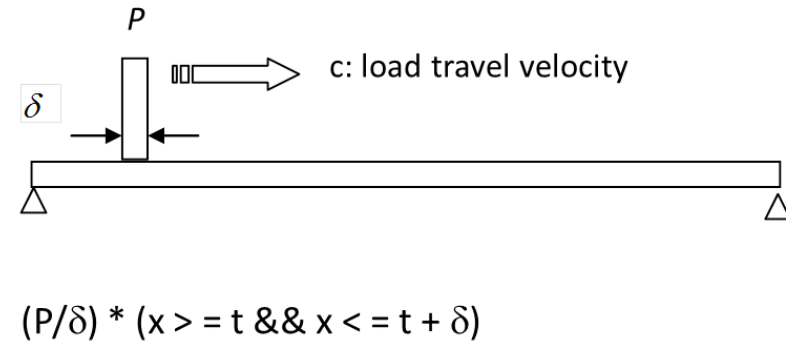
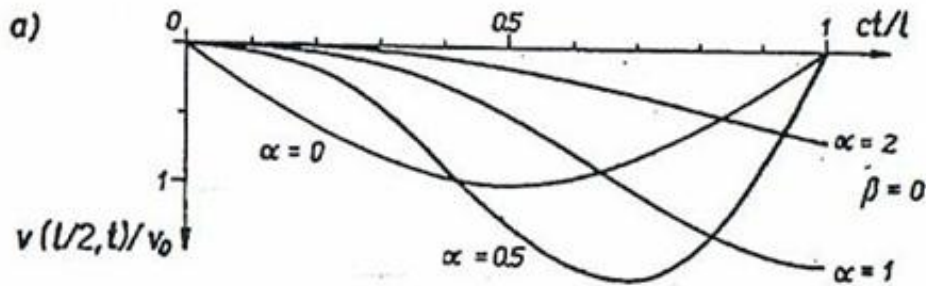
Problem Statement



- Sound source detection using continuous sensor structures (inverse problem)
- Start with the forward problem: effect of beam design parameters on the inverse problem requirements)

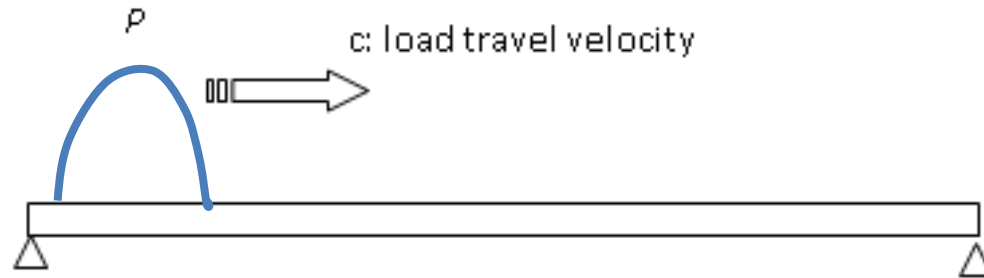
Validation-concentrated moving load:

Fryba, L (1999) analytical solution

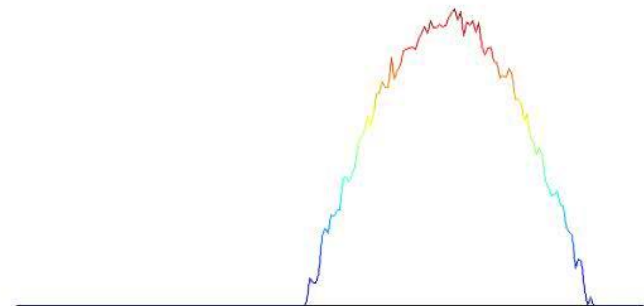
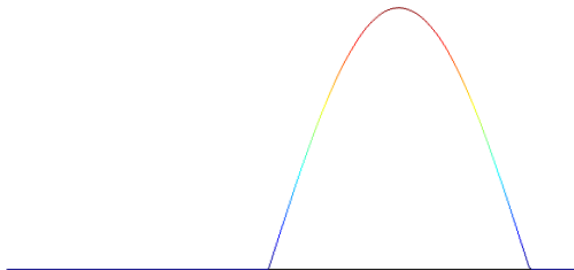


Validation-sinusoidal moving load:

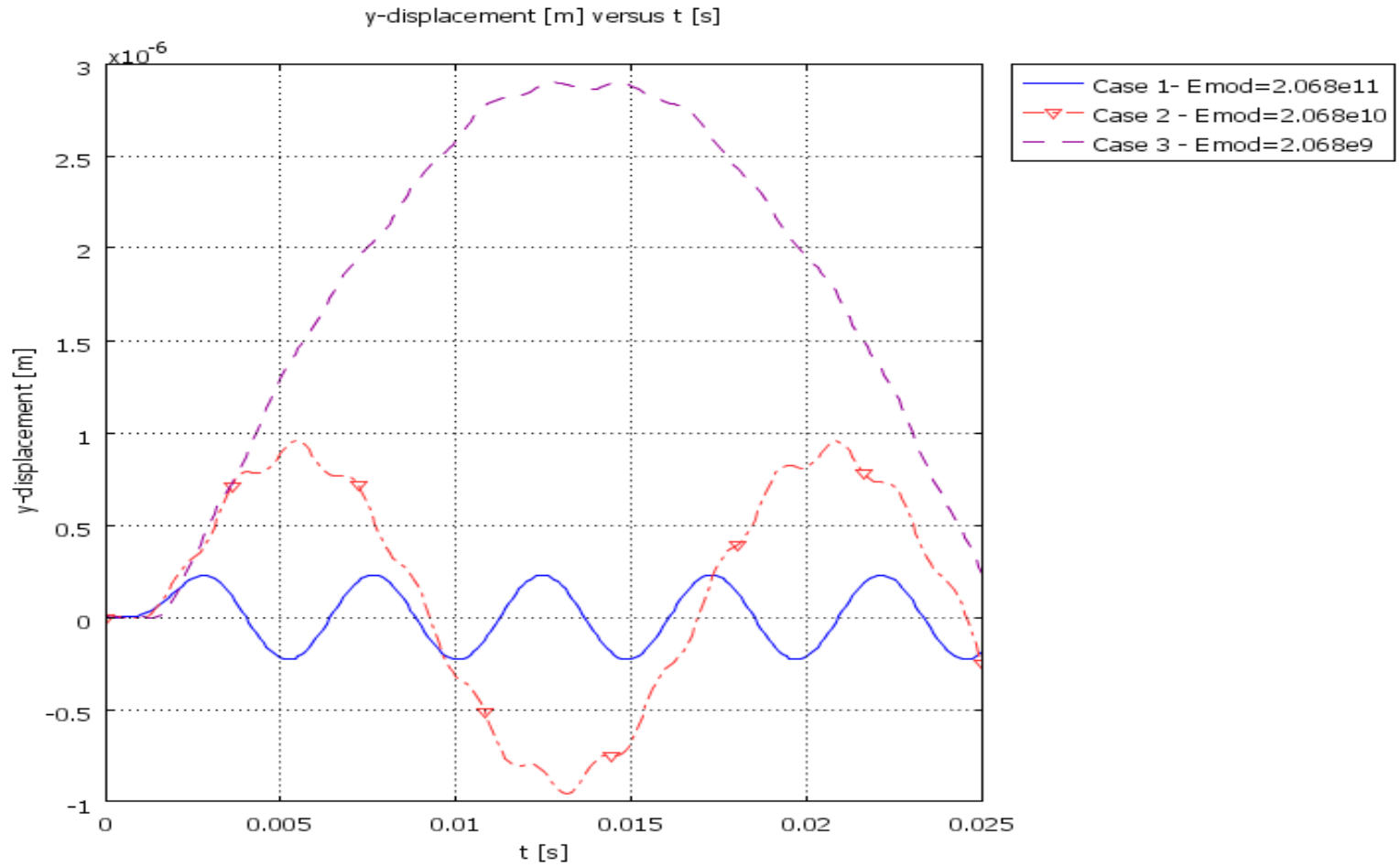
Shepard Jr., W. S. et al (2008) solution



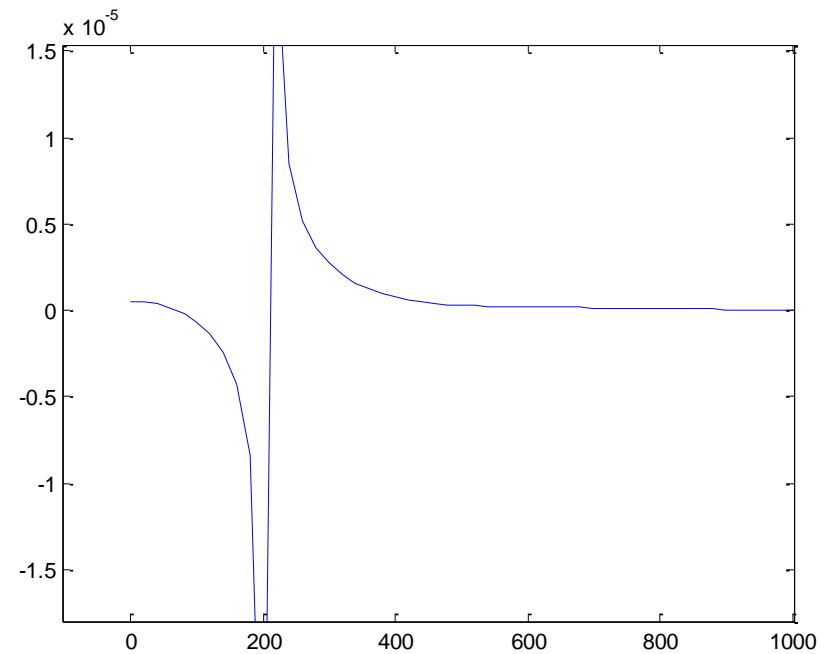
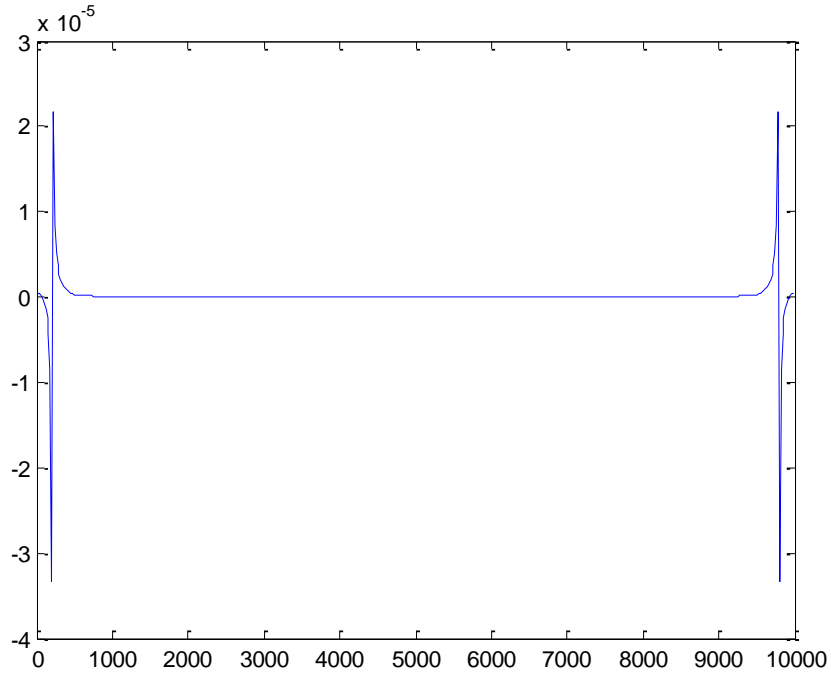
$$F_y = (r_n1(x) - AA * \sin((\pi / (c * \text{capt})) * (x - c * t))) * ((x \leq c * t) \& \& (x \geq c * t - (c * \text{capt})))$$



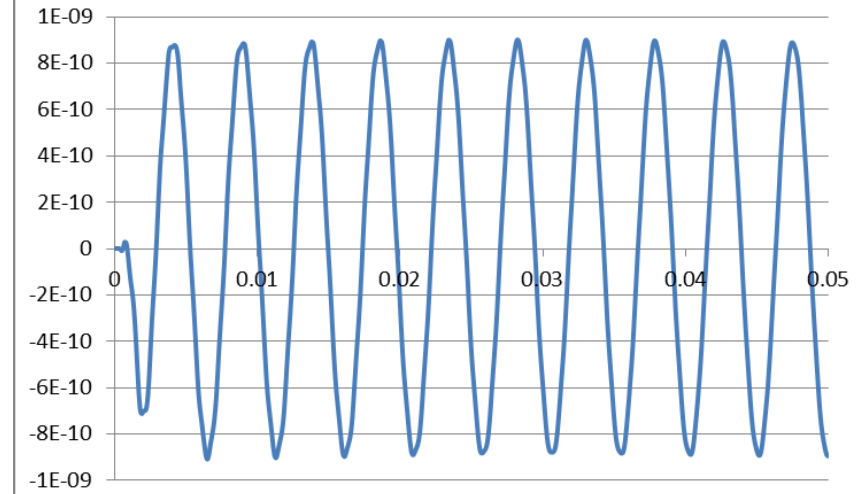
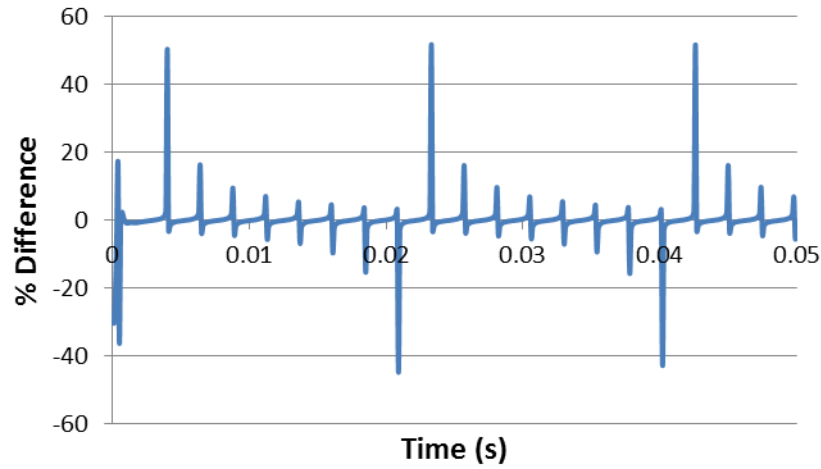
Effect of material stiffness- time domain



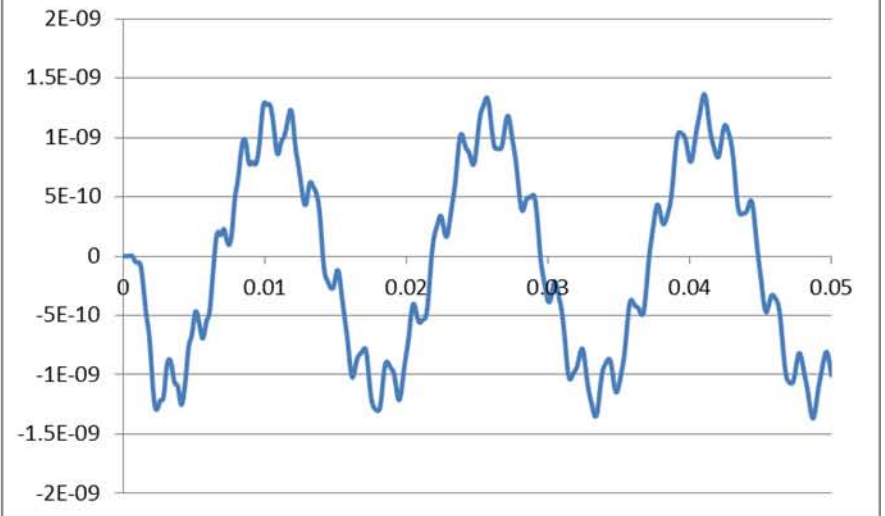
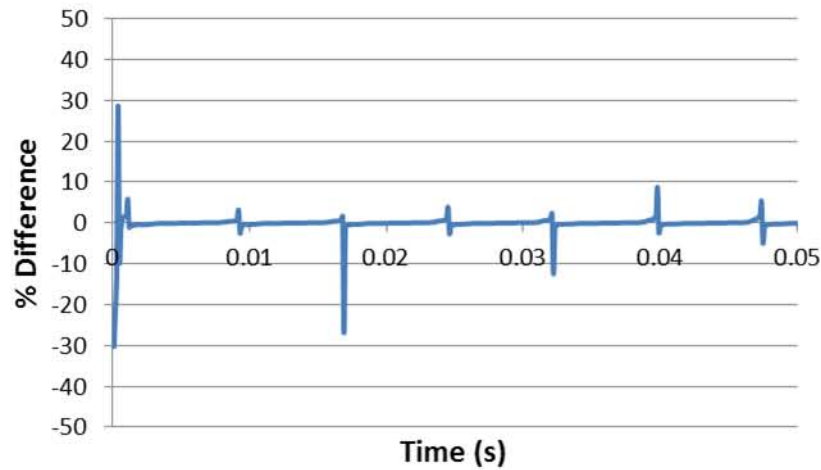
Effect of material stiffness: $E=2.01e11$



E=2.01e11



E=2.01e10



Effect of material stiffness: $E=2.01e10$

