

Physical acoustics – Numerical examples with elastic waves

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1 The Christoffel tensor is a good friend of mine...

Show the results announced on slide 5 of the lecture on bulk elastic waves in elastic solids (cubic crystals case).

2 ... though he sometimes gets on my nerves

Show the results announced on slide 14 of the lecture on bulk elastic waves in piezoelectric solids (lithium niobate).

3 A simple bulk acoustic wave resonator

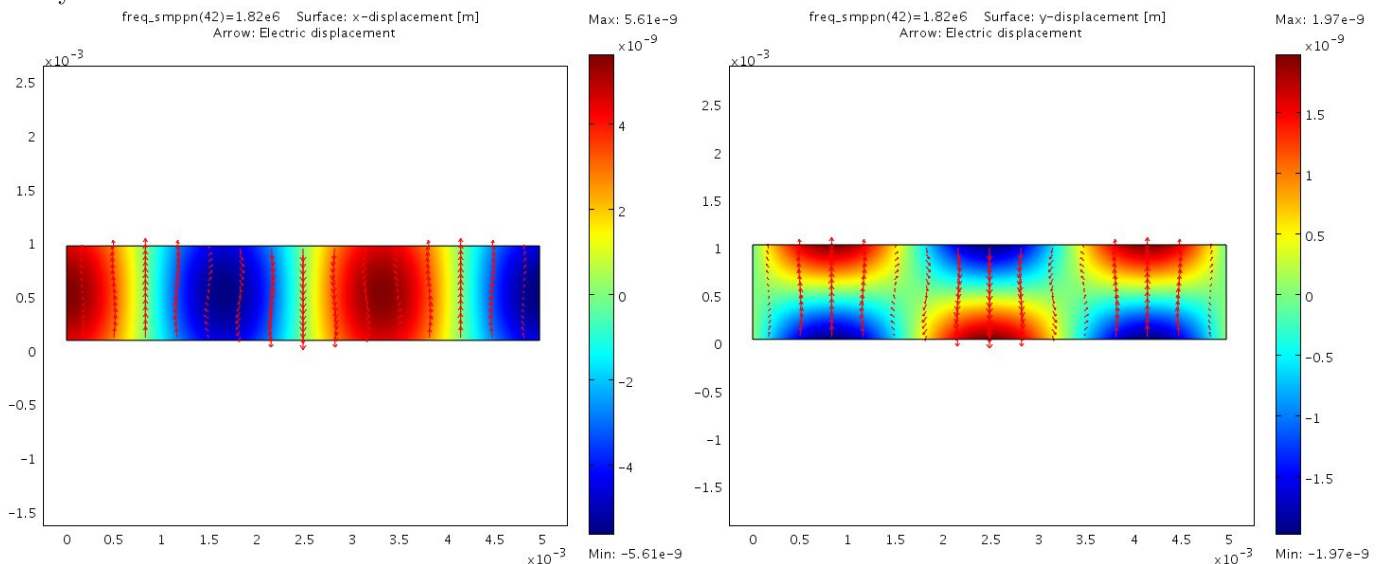
3.1 Please identify my resonances

I am a wafer of lithium niobate with thickness 1 mm, in the Y cut. My top and bottom surfaces are metallized to apply an electrical potential through me.

- Justify that bulk elastic waves travelling along direction Y or [010] can be generated.
- Use the previous problem to show that pure shear waves cannot be excited.
- Use the previous problem or slide 17 of the lecture on bulk elastic waves in piezoelectric solids to obtain a rough estimate of the first two thickness resonances.

3.2 Quasi-shear fundamental mode

Is it easy to obtain me with a brute force calculation in Comsol?



3.3 Quasi-longitudinal fundamental mode

Is it easy to obtain me with a brute force calculation in Comsol?

