

1.138J/2.062J, WAVE PROPAGATION

Fall, 2000 MIT

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Homework set No. 4. Due Nov15. 2000.

1. For a cylindrical cavity in an elastic solid, consider two scattering problems ϕ_1 and ϕ_2 each corresponds to the angle of incidence θ_1 and θ_2 , but to the same frequency.
. Show that

$$\mathcal{A}_1(\theta_2) = \mathcal{A}_2(\theta_1) \tag{H.4.1}$$

2. Diffraction of SH wave by a thin crack. Find by the parabolic approximation the transition solution along the edge of the reflection zone.

3. Consider a plane problem in x, y . The upper half plane is occupied by an inviscid fluid of density ρ_o and sound speed c . The lower half plane is occupied by a homogenous and isotropic elastic solid.

A plane monochromatic train of sound is incident from $y > 0$ obliquely towards the interface. Find the reflected sound in the fluid and the transmitted elastic waves in the elastic solid. Discuss the results, ... critical angles, etc.