عنوان مقاله:

Wave Motion due to a Ring Source in Two Superposed Fluids Covered by a Thin Elastic Plate

نویسندگان:

N. Islam - *Department of Mathematics, Indian Institute of Technology, Kharagpur - ۷۲۱۳۰۲, India*

R. Gayen - *Department of Mathematics, Indian Institute of Technology, Kharagpur - ۷۲۱۳۰۲, India*

B. N. Mandal - *Physics and Applied Mathematics Unit, Indian Statistical Institute, Kolkata ۷۰۰۱۰۸, India*

خلاصه مقاله:

The problem of wave generation by a horizontal ring of wave sources of the same time-dependent strength present in any one layer of a two-layer fluid is investigated here. The upper fluid is of finite height above the interface and is covered by a floating thin infinite elastic plate (modeling a thin sheet of ice) while the lower fluid extends infinitely downwards. Assuming linear theory, the problem is formulated as an initial value problem and the Laplace transform in time is employed to solve it. For time-harmonic source strength, the asymptotic representations of the potential functions describing the motion in the two layers for large time and distance are derived. In these representations, the two different coefficients for each of the surface and interface wave modes have the same numerical values although it has not been possible to prove their equivalence analytically. This shows that the steady-state analysis of the potential functions produces outgoing progressive waves at the surface and at the interface. The forms of the surface and interface waves are depicted graphically for different values of the flexural rigidity of the elastic plate and the ring source being submerged in the lower or upper layer.

کلمات کلیدی:

Ring source potentials, layer fluid, Two, Thin elastic plate, Steady, state analysis