Find eigenvalues $c = +/- a_0$ and eigenvectors $L = (+/- a\_0, \rho_0)$
Write in characteristic form and solve.
Solution superposition of two waves: left and right going sound waves.
Get form
$(u + (a_0/\rho_0)*R)_t + a_0*(u + (a_0/\rho_0)*R)_x = 0,$
$(u - (a_0/\rho_0)*R)_t - a_0*(u - (a_0/\rho_0)*R)_x = 0.$

Thus:
$u + (a_0/\rho_0)*R = f(x-a_0*t),$
$u - (a_0/\rho_0)*R = g(x+a_0*t).$

So:
$u = (1/2)*[f(x-a_0*t) + g(x+a_0*t)],$
$R = (\rho_0/(2*a_0))*[f(x-a_0*t) - g(x+a_0*t)],$
$P = (a_0/2)*[f(x-a_0*t) - g(x+a_0*t)],$

where $P = (a_0^2/\rho_0)*R$ is the pressure perturbation.

Review of Gauss/Stokes Theorem and implications for solvability of:
When is $u_x + v_y = 0$ equivalent to $psi_x = v$ and $psi_y = -u_x$?

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