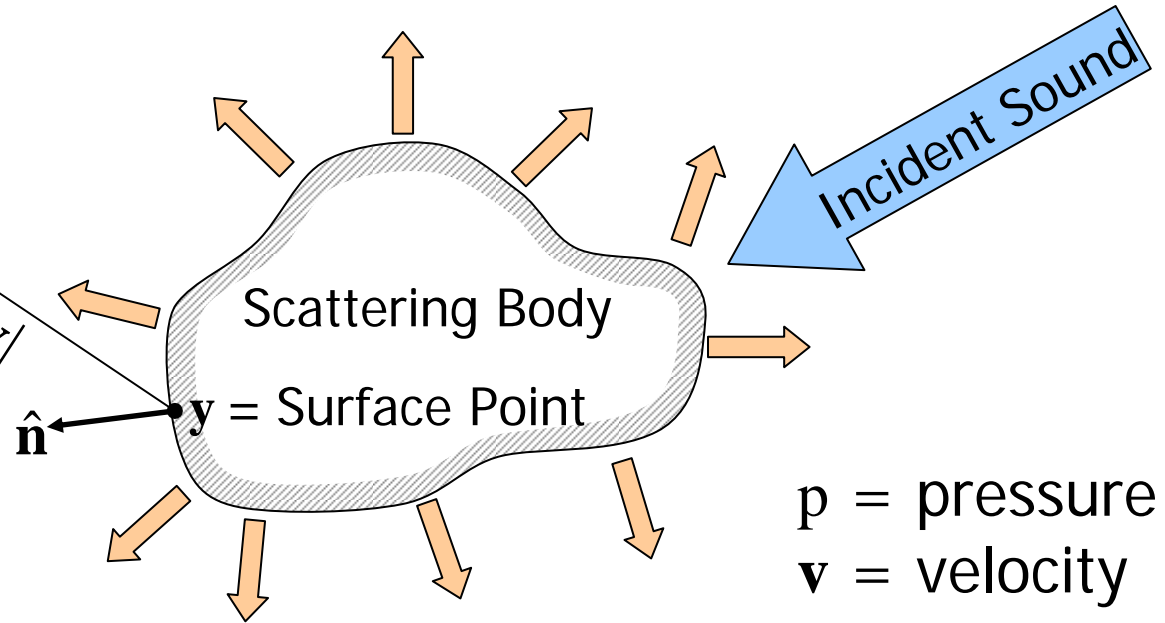


Kirchhoff-Helmholtz Integral Theorem

← = Scattered Sound

Listener Point = \mathbf{x}

Surface pressure is found from incident by knowing pressure inside the body must be zero



p = pressure
 \mathbf{v} = velocity

$$p(\mathbf{x}) = p_{incident}(\mathbf{x}) - \frac{1}{4\pi} \iint_{Surface} (G(|\mathbf{x} - \mathbf{y}|, f) \hat{\mathbf{n}} \cdot \mathbf{v}(\mathbf{y}) - p(\mathbf{y}) \hat{\mathbf{n}} \cdot \nabla' G(|\mathbf{x} - \mathbf{y}|, f)) d\mathbf{y}$$

Green's function describes how sound radiates from a point.

$$G(|\mathbf{x} - \mathbf{y}|, f) = \frac{e^{i \frac{2\pi f}{c} |\mathbf{x} - \mathbf{y}|}}{|\mathbf{x} - \mathbf{y}|}$$