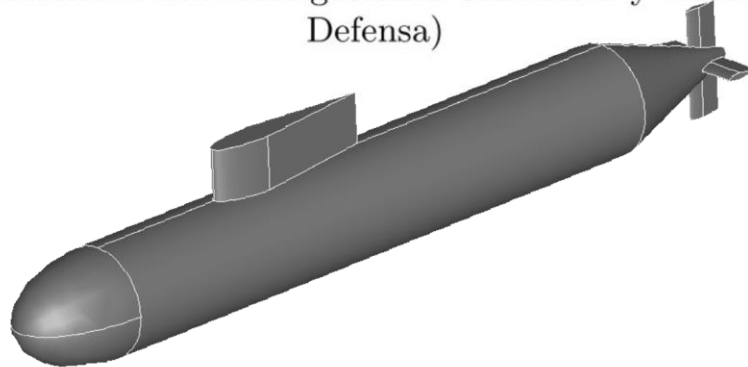


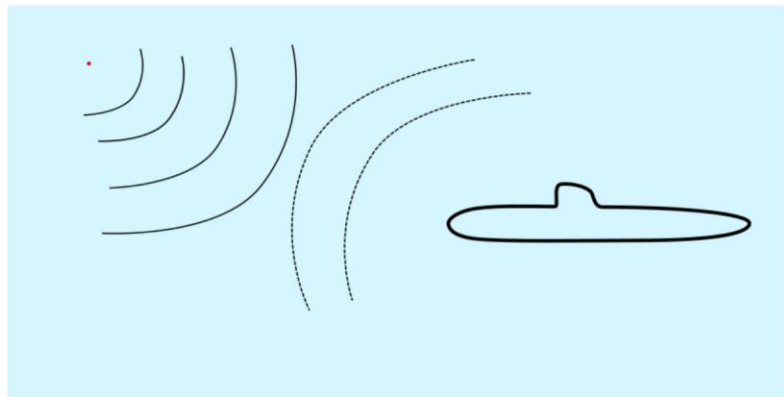
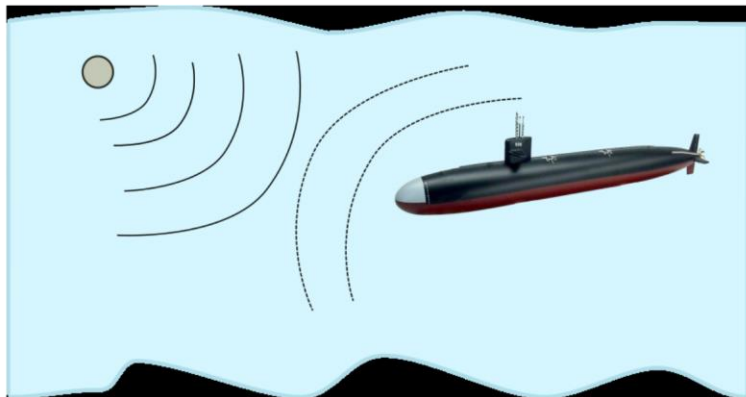
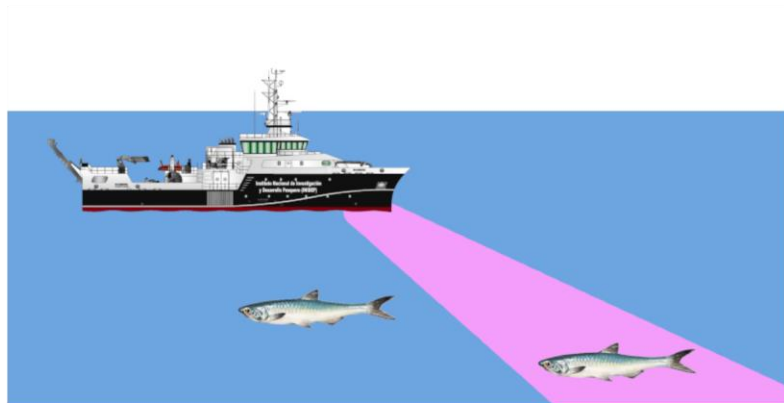
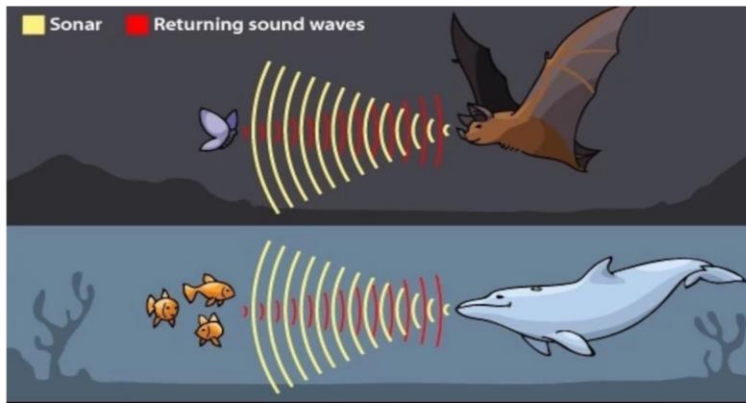
Métodos computacionales 3D para predicción de retrodispersión acústica (Fuerza de Blanco) de submarinos.

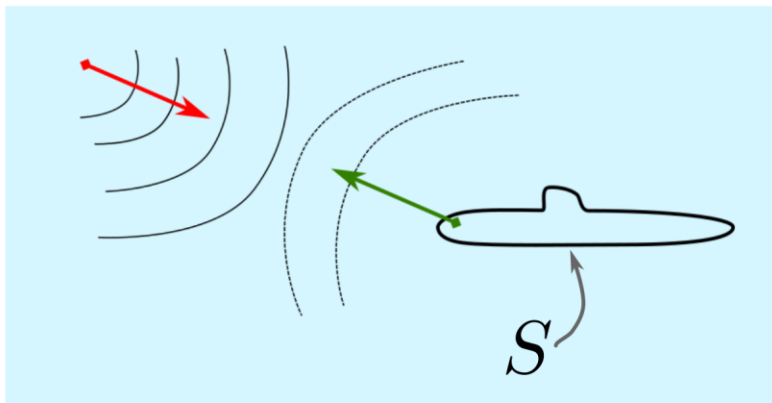
Edmundo F. Lavia, Juan D. Gonzalez, Rui A. Marquez Rojo y Igor S. Prario

Departamento de Propagación Acústica. Dirección de Investigación de la Armada (DIIV). Laprida 555 Vicente Lopez, (1638) Buenos Aires, Argentina

UNIDEF (Consejo Nacional de Investigaciones Científicas y Técnicas – Ministerio de Defensa)







$$\varphi(x, t) = \varphi(x) e^{-i\omega t}$$

$$(\nabla^2 + k^2) \varphi = 0 \quad + \quad \text{BC}$$

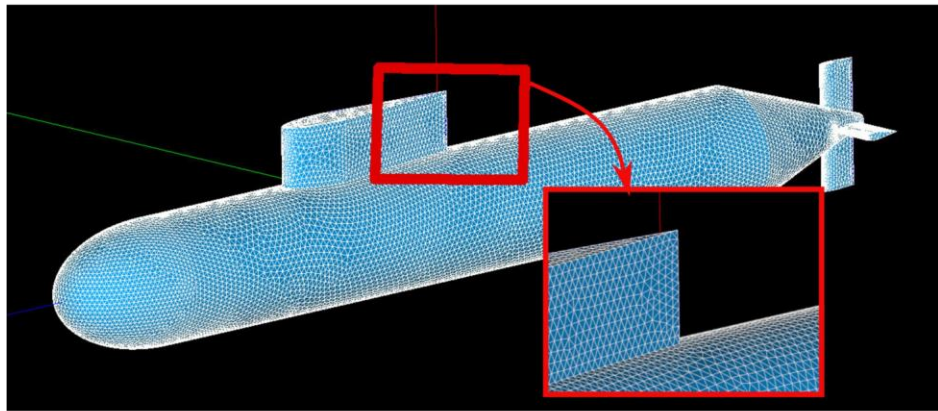
$$k = \frac{\omega}{c} = \frac{2\pi f}{c} = \frac{2\pi}{\lambda}$$

PDE \rightarrow BIE

$$\varphi(x) = \int_S [\partial_n \varphi(y) G(x, y) - \varphi(y) \partial_n G(x, y)] dS(y)$$

$$G(x, y) \equiv e^{ik|x-y|} / (4\pi|x-y|)$$

$$\varphi(x) = \int_S [\partial_n \varphi(y) G(x, y) - \varphi(y) \partial_n G(x, y)] dS(y)$$



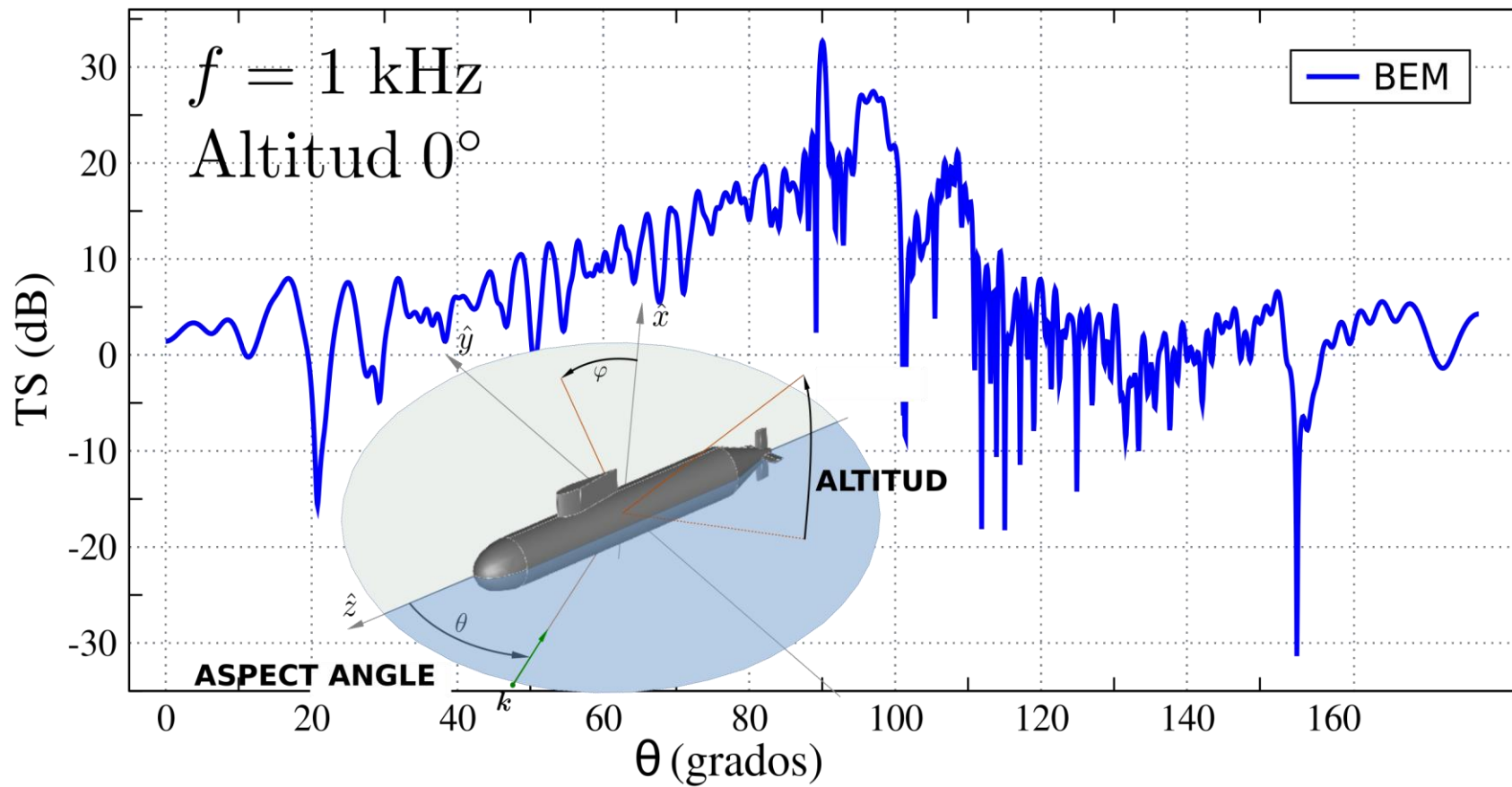
$$K_{ij} \varphi_j = \varphi_j^{\text{inc}}$$

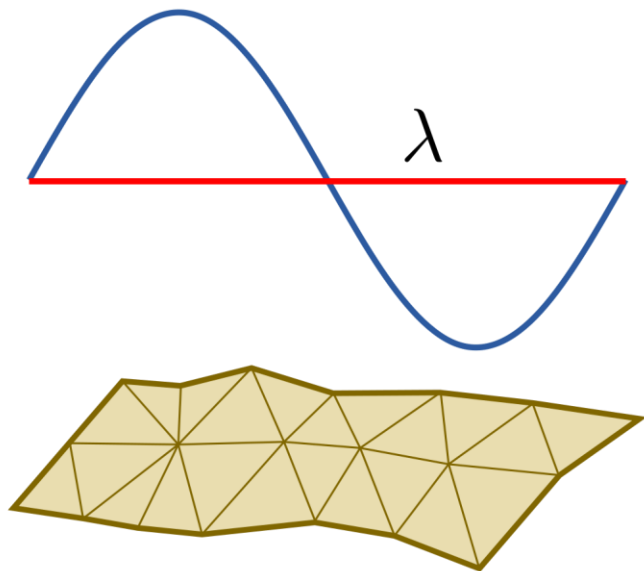
$$K \in N \times N$$

$$K_{ij} = \int_{\Delta_j} \frac{e^{ikr}}{r^2} (ikr - 1) \hat{r} \cdot \hat{n} dS(y)$$

$$r = |x_i - y_j|$$

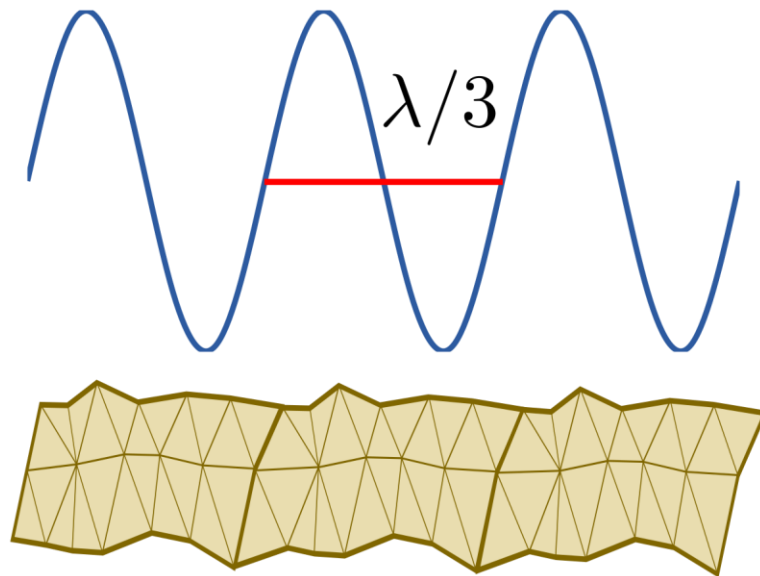






$$f = 1 \text{ kHz}$$

1



$$f = 3 \text{ kHz}$$

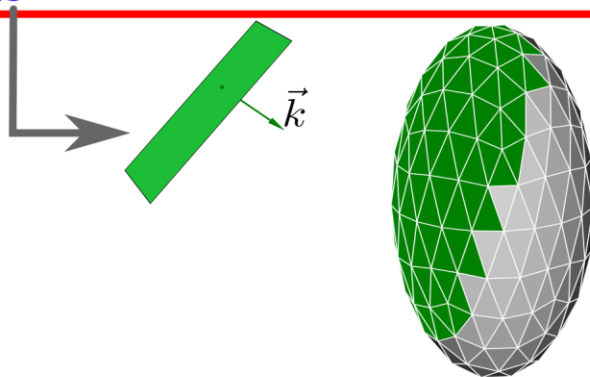
9

BEM

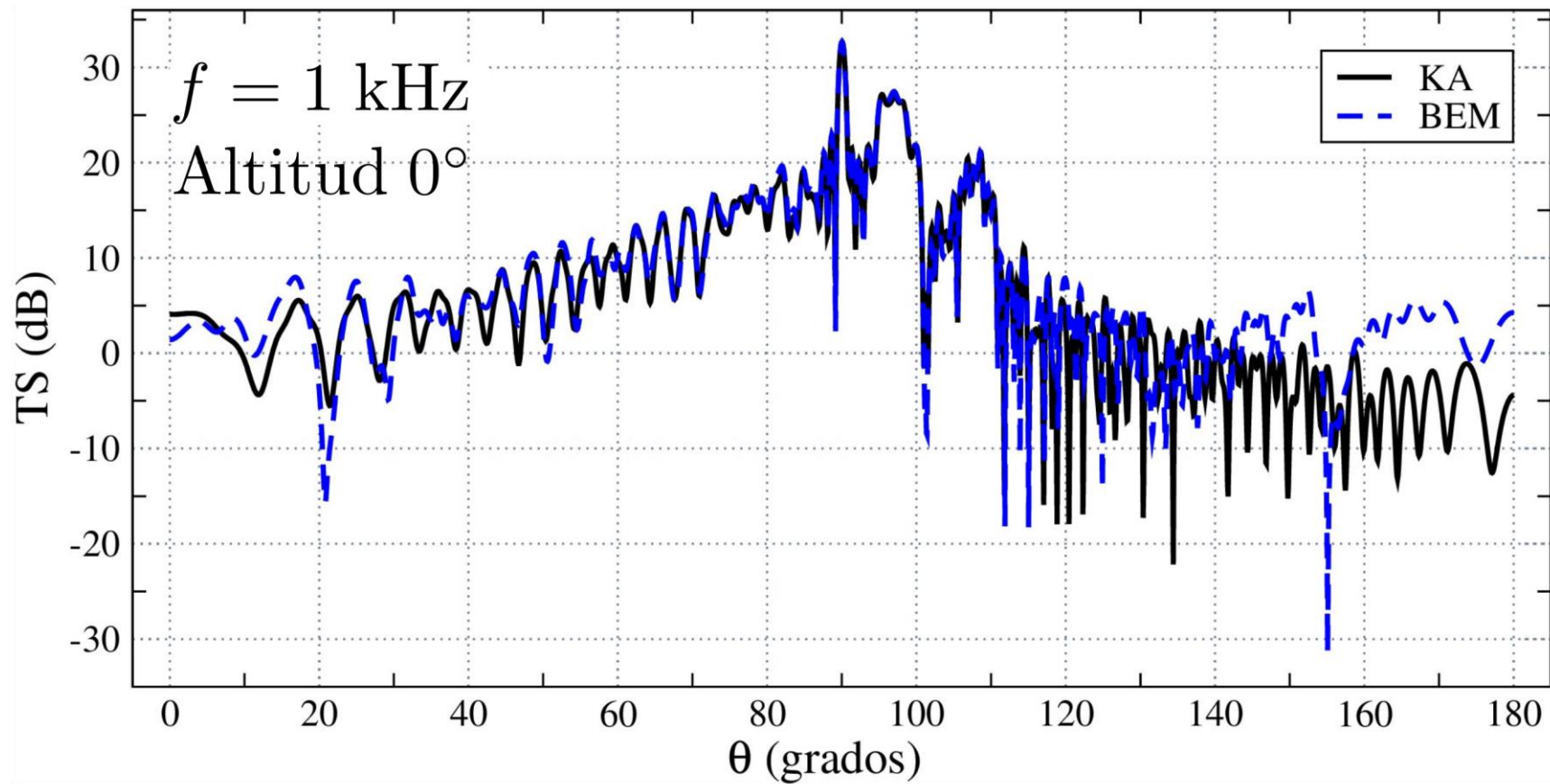
$$\varphi(x) = \int_S [\partial_n \varphi(y) G(x, y) - \varphi(y) \partial_n G(x, y)] dS(y)$$

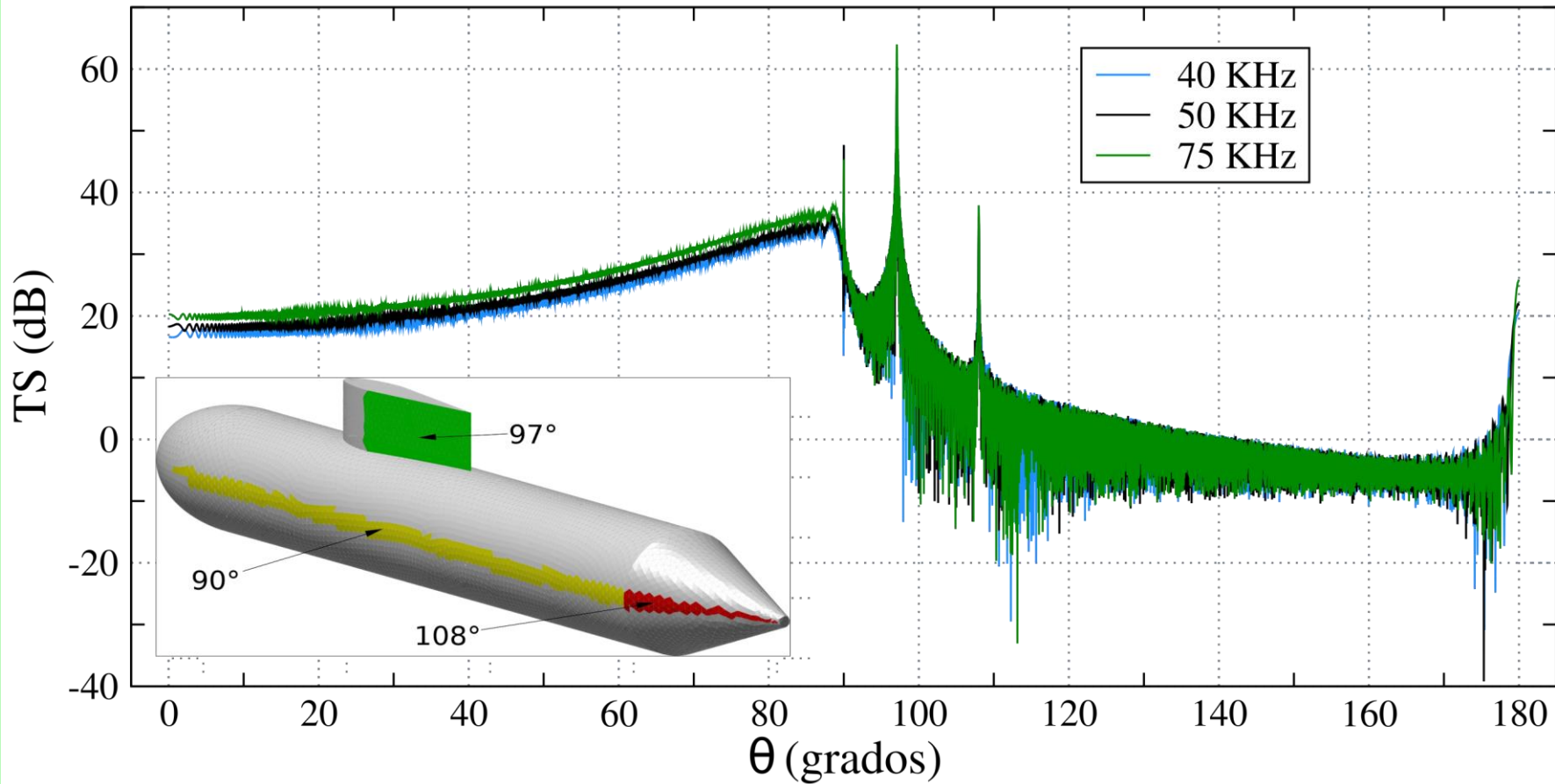
Kirchhoff

$$\varphi(x) = \int_S [\partial_n \varphi^{\text{inc}} G(x, y) - \varphi^{\text{inc}} \partial_n G(x, y)] dS(y)$$



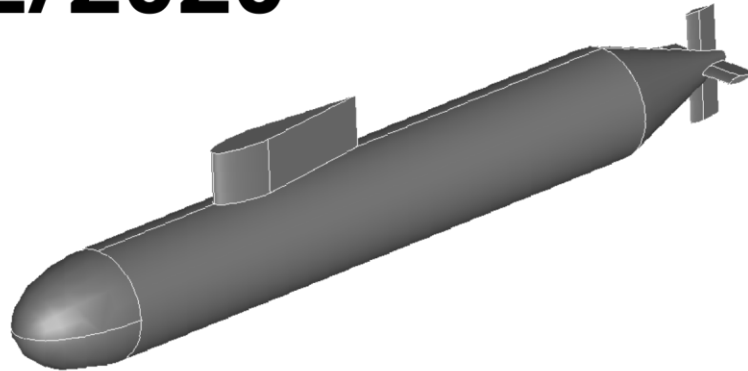
$$\varphi(x) = \sum_{j=1}^N \int_{\Delta_j} \dots$$





PIDDEF 13/2014

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FIN