

应用地球物理学

平面海底界面上球体目标的声散射建模研究

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摘要 根据目标声散射的T矩阵方法、将界面附近点源激发的声场利用复像方法展开、并考虑到界面对散射声场的影响,建立了平面海底界面上方目标的声散射模型.与已有模型相比,该模型能够计算更一般情况点源激发的三维声散射场.通过计算考察基于复像方法的有关系数证明了该模型的准确性,并给出了不同入射方向的界面上刚性球体和弹性球壳的散射声场算例,对目标散射幅度的分布以及随角度的变化规律做了分析.最后,设计实验对该模型做了验证.

关键词 [声散射](#) [平面海底](#) [球体目标](#) [T矩阵方法](#),[复像方法](#)

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Modeling of acoustic scattering by sphere on a planar seabed

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Abstract A model of acoustic scattering from spherical target above a planar seabed is advanced to a condition of irradiation by a point source, with both of T matrix method and complex images method. Compared to the model of Fawcett and Lim, this model could be used to calculate scattering field from a target above a planar interface in three dimension space. Comparing some coefficients by complex images method with that by analytical formula or numerical quadrature, the computing method of the model is examined to be efficient and accurate. In addition, numerical examples of a rigid sphere and an elastic spherical shell are compared for scattering field from the target on a fluid seabed, and the scattering field dependent angle is investigated from the different grazing angle of incident wave. In order to verify the model, an experiment is carried out to measure scattered field received by vertical array in laboratory. Data are analyzed and compared with calculated results.

Key words [Acoustic scattering](#); [Planar seabed](#); [Spherical target](#); [T matrix method](#); [Complex images method](#)

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