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**Application of the matrix Rytov method to the calculation of the
coherence function of a sound field in an oceanic waveguide**

Alex Voronovich and Vladimir Ostashev
NOAA/Earth System Research Laboratory, 325 Broadway, Boulder, CO 80305, USA

Closed equations for the coherence function of a monochromatic sound field propagating in a statistically inhomogeneous 3D oceanic waveguide have high dimensions and are difficult to solve even with the use of modern computers. Significant reduction of the dimension of the problem was achieved by assuming that sound speed fluctuations are statistically isotropic in a horizontal plane. However, even in this case calculation of the coherence function for a megameter range takes about a day. In this paper, we develop an approximate solution of the closed equations for the coherence function which is similar to a matrix version of the Rytov method. An explicit expression for the coherence function is obtained which contains exponent of an "interaction" matrix. This matrix is determined in terms of the acoustic and internal wave modes and spatial spectrum of the sound speed fluctuations. It is shown that the matrix Rytov method provides an accurate solution for the coherence function which coincides with the solution of the closed equations within a few percent. Calculation of the coherence function now takes only about an hour. This allows us to study in detail the dependence of the coherence function on parameters of the problem.