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Title: Numerical simulations of scattering of light from two-dimensional surfaces using the Reduced Rayleigh Equation

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For a long time, the Reduced Rayleigh Equation (RRE) has been used as an approximation to solve the problem of light scattering from rough surfaces. In this paper, we study the scattering of light from two-dimensional rough surfaces, bounding a medium characterised by an arbitrary complex dielectric function, by direct discretisation of the RRE. To the best of our knowledge, this has not previously been done, in part due to the large memory requirements. We discuss the implementation of a parallel code to numerically solve the RRE, the relative merits of LU-factorisation versus iterative solvers and the achieved performance. We also report on results for simulations of rough silver surfaces, characterised by a Gaussian height distribution and a Gaussian correlation function, which display the phenomenon known as enhanced backscattering.