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A fast algorithm for simulating scattering from a radially symmetric potential

Standard solvers for the variable coefficient Helmholtz equation in two spatial dimensions have running times which grow at least as fast as $\mathcal{O}\left(k^2\right)$ in the wavenumber k of the problem. I will describe an algorithm which only applies in the very special case in which the coefficient is radially symmetric, but whose running time is $\mathcal{O}(k\ log(k))$.