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Cascadic Multigrid Algorithms for the Solution of Helmholtz Equations.

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In most scenarios, traditional multigrid methods fail to converge in the case of the Helmhotz equation with relatively large wave numbers. One approach for tackling this problem is to use a Krylov type algorithm both as a smoother and as an outer iteration method in the multigrid cycles. In this presentation, we extend this methodology to the iteration methods based on the cascadic principle. Such algorithms are usually referred to as one-way multigrid methods. We consider an adaptive control strategy for the number of iterations on successive refinement levels and present numerical results that illustrate the efficiency of the proposed approach.