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Multigrid Methods for Two-Dimensional Maxwell's Equations on Graded Meshes

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In this work we investigate the numerical solution for two-dimensional Maxwell's equations on graded meshes. The approach is based on the Hodge decomposition. The solution $\boldsymbol{u}$ of Maxwell's equations is approximated by solving standard second order elliptic problems. The quasi-optimal error estimates for both $\boldsymbol{u}$ and $\nabla \times \boldsymbol{u}$ in the L_2 norm are obtained on graded meshes. We prove the uniform convergence of the W-cycle and full multigrid algorithms for the resulting discrete problem. The performance of these methods is illustrated by numerical results.