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An application of quaternionic analysis to the solution of time- independent Maxwell equations and of Stokes equation. (English) [Zbl 0704.35128](#)

Abstract analysis, Proc. 14th Winter Sch., Srní/Czech. 1986, Suppl. Rend. Circ. Mat. Palermo, II. Ser. 14, 61-76 (1987).

[For the entire collection see [Zbl 0627.00012](#).]

Special 3-dimensional boundary value problems (with smooth boundaries) can be solved in an effective manner by relating the boundary collocation method, as a synthesis of analytical and numerical techniques, with an operator calculus based on so called quaternionic analysis, where quaternions are special four-dimensional vectors. So, suitable operators are described and included in a general operator theory. Then, the boundary collocation method is presented and applied to find an approximative solution of time-independent Maxwell equations, with constant or x -dependent parameters, respectively to Stokes' equation. To appropriate the paper, most of the mentioned literature should be consulted.

Reviewer: J.Appeltauer

MSC:

- [35Q60](#) PDEs in connection with optics and electromagnetic theory
- [35Q35](#) PDEs in connection with fluid mechanics
- [65Z05](#) Applications to the sciences
- [35L50](#) Initial-boundary value problems for first-order hyperbolic systems
- [35J55](#) Systems of elliptic equations, boundary value problems (MSC2000)

Keywords:

[boundary collocation method](#); [quaternionic analysis](#); [Maxwell equations](#); [Stokes' equation](#)