FSM supported by HAM for BVPs with unknown fundamental solution

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The Method of Fundamental Solutions (MFS) became more popular in last decades for engineering applications. In many engineering problems which are Boundary Value Problems (BVP) the used equations are Poisson equation, biharmonic ones or systems of such equations. It is quite obvious to implement MFS is such cases because fundamental solutions of such equations are known. The problem with getting fundamental solution appears for quite large class of engineering problems, which are BVP consisting of equations with unknown fundamental solutions or known fundamental solutions, but numerically very badly conditioned. The proposal of this paper is to support MFS by Homotopy Analysis Method (HAM) to solve such problems. In this paper the HAM supporting MFS is applied to several engineering problem related to anisotropic materials, problems of non-uniform geometry characteristics, material characteristics dependent on spatial variables etc. The numerical experiment shows that the results obtained by proposed algorithm achieved demanded accuracy.

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