

# **Equilibrated Basis Functions (EqBFs) in Solution of Engineering Problems; Potentials and Prospects**

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## **ABSTRACT**

The possibility of finding equilibrated basis functions (EqBFs) for a number of partial differential equations (PDEs) having application in engineering problems will be discussed. When the governing PDE is of constant-coefficient type these bases may take the form of exponential basis functions (EBFs). With the EqBFs or EBFs in hand, the numerical solution process may have much in common with Trefftz methods. The formulation may be cast in a boundary point style as well as a meshless style with distributed domain points. Discussion will be given for the solution merits using EqBFs or EBFs when compared with the well-known numerical methods such as the finite element method or the boundary element method. The engineering problems so far dealt with are; acoustic problems with high wave numbers, composites and laminated plates, problems with porous materials, convection dominated problems, those with non-local characteristics, potential flows, viscous flows etc. Results of several numerical experiments, including those defined in time and space, will be presented to demonstrate the capabilities of the method in the solution of a wide range of linear and non-linear engineering problems.