

## **Analysis of the 5:1 Dipole Benchmark Case Using the Current-Model Method with an SVD-Improved Point Matching Technique**

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**Abstract**—The 5:1 dipole benchmark case has been analyzed extensively by many researchers using different codes based on various numerical techniques. In this paper this benchmark case is solved by the current-model method in which the fulfillment of the boundary condition is improved using the singular value decomposition (SVD) of the moment matrix. The SVD is the most informative general representation of a matrix and its use in the current-model method improves the stability as well as the accuracy of the numerical solution. Its application results in a considerable reduction of the boundary condition errors between the matching points. Obviously, the boundary condition errors at the matching points are no longer strictly zero, but acceptably low values are retained. Comparisons between the results obtained using the various techniques are presented. It is shown that the difference between Ludwig's results, which are based on a spherical-wave expansion approach, and ours is within the error estimate characterizing the former results accuracy.