

## **Surface Integral Equation Methods with Reverse Operation Self-consistent Evaluation (ROSE)**

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In this paper, we extend the application of reverse operation self-consistent evaluation (ROSE) technique to compute matrix entries in surface integral equations. The use of ROSE allows us to directly address the hyper-singular integrals in electric field integral equation without the aid of integration by part. As a consequence, we are able to employ discontinuous vector basis functions, square-integrable vector functions, on mixed element types such as triangular and quadrilateral elements.

Moreover, the use of discontinuous basis functions on non-conformal discretization leads to a simple but effective formulation for impedance boundary condition. Herein, we have employed constant vector basis functions over discretizations that are made of both triangular and quadrilateral elements. We shall demonstrate the employment of the constant vector basis functions enjoys the same error-rate-of-convergence as the conventional conformal RWG basis functions. The flexibility of mixing different types of elements within the same discretization offers great potentials in complex electromagnetic problems. The use of the non-conformal DG method, the formulation of the impedance boundary condition can be fairly straightforward and no additional memory, except some overheads, will be required as compared to the PEC scattering problems.