

## Original Paper

# A Novel Numerical Approach for Solving Weight Function of Electromagnetic Flow Meter

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### Abstract

A novel finite element procedure for the solution of the electromagnetic flow meter weight function is presented. The weight function represents the relative contribution of the location at flow cross section to the output signal of the flow meter. This paper treats the problem as the intuitive the approach, in which the distribution of the virtual current density is considered as the substitute for the weight function with the hypothetical current excitation source, is presented. First, a numerical simulation model was constructed with COMSOL Multiphysics. Next, a study was undertaken to compare the numerical simulation model with Shercliff's analytical solution for the weight function. The finite element methodology was found to be correct for solving the weight function. The methodology presented in this paper represents the first stage in the development of an image reconstruction technique which could be used to obtain the liquid velocity profile of Multiphase flows.

### Keywords

Electromagnetic flow meter – Numerical simulation – Virtual current density – Weight value