

## **An introduction to the Boundary Element Method**

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### **Contents:**

Basic notions of polynomial interpolation and numerical integration.

Weakly singular integrals, Cauchy principal value integrals and Hadamard finite part integrals.

Boundary integral formulation of elliptic boundary value problems.

Integral operators with weakly singular, strongly singular and hyper-singular kernels.

Approximation technique: the Boundary Element Method (BEM).

Quadrature schemes for the generation of the linear system coming from BEM discretization.

Computational experience in Matlab/Fortran programming languages.

**Prerequisites:** Knowledge of basic notions of Numerical Analysis and in particular in numerical approximation of partial differential equations.

### **Bibliography:**

Notes will be provided during lectures. General textbook references are:

Chen, G., Zhou, J.: Boundary Element Methods, Academic Press, 1992

Quarteroni, A., Valli, A.: Numerical Approximation of Partial Differential Equations, Springer Series in Computational Mathematics, 1994