# B-Spline-based quadrature schemes in Isogeometric Analysis for Boundary Element Methods

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In the numerical solution of many differential problems arising in the applications a possible approach is to reformulate the problem by integral equations defined on the boundary of the given domain, giving rise to the so called Boundary Element Methods (BEMs). These methods have two main advantages, the dimension reduction of the computational domain and the simplicity for treating external problems. As a major drawback, the resulting integrals can be singular and therefore robust and accurate quadrature formulas are necessary for their numerical computation.

On the other side, the new Isogeometric analysis approach (IgA), establishes a strict relation between the geometry of the problem domain and the approximate solution representation, giving surprising computational advantages. In the IgA setting a new formulation of BEMs has been studied, where the discretization spaces are splines spaces represented in B-spline form, [1, 2]. In order to take all the possible benefits from using B-splines instead of Lagrangian basis, an important issue is the development of specific new quadrature formulas for efficiently implementing the assembly phase of the method. In this talk the problem of constructing appropriate and accurate quadrature rules, tailored on B-splines, for Boundary Integral Equations is addressed. The proposed approach uses some of the properties of B-splines - local support, global regularity, recursive formulae - in order to gain optimal convergence rate and good ratio between computational effort and accuracy, [3].

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## References

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