IGA-BEM for 2D Lifting Flows

C.G. Politis[1], A.-A.I. Ginnis[2], K. Kostas[3], P.D. Kaklis[4*] and S. Chouliaras[4]
[1] Technological Educational Institute of Athens, Dept Naval Architecture,
Agiou Spyridonos 12243 Egaleo, Athens, Greece, cpolitis@teiath.gr,
http://www.na.teiath.gr/
[2] National Technical Univ Athens, Dept Naval Architecture & Marine Engineering,
Zografou Campus, 9 Iroon Polytechneiou Str 15780 Zografou, Greece,
ginnis@naval.ntua.gr, http://www.naval.ntua.gr
[3] Nazarbayev University, School of Engineering, Mechanical Engineering Astana, 53,
Kabanbay batyr Ave., Astana, Kazakhstan, konstantinos.kostas@nu.edu.kz,
https://nu.edu.kz/faculty/konstantinos-kostas
[4] University of Strathclyde, Dept Naval Architecture, Ocean and Marine Engineering,
100 Montrose Street, G4 OLZ, Glasgow, UK, Panagiotis.kaklis@strath.ac.uk,
https://www.strath.ac.uk/engineering/navalarchitectureoceanmarineengineering

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Combining Iso-Geometric Analysis (IGA) with Boundary Element Methods (BEM) for 2D hydrofoils, moving with constant speed in an ideal fluid of infinite extent, imposes a number of difficulties. Firstly, an IGABEM collocation scheme has to take into account the unit-tangent-vector discontinuity occurring along the trailing edge (TE). More important, the scheme has to handle the Kutta condition, securing continuity of the normal velocity and pressure through the a-priori unknown wake, a force-free boundary surface emanating from the TE.

In this presentation we shall present and compare a number of IGABEM collocation schemes that employ different types of Kutta conditions, starting from the so-called *Morino-Kutta* condition [1] and opting for more complex ones, imposing a-priori zero-pressure jump at the TE. Comparisons will include the behavior of the pressure coefficient in the neighborhood of the TE as well as circulation's convergence rate.

[1] K.V. Kostas, A.-A,I. Ginnis, C.G. Politis and P.D. Kaklis, Shape-optimization of 2D hydrofoils using an Isogeometric BEM solver, *Computer-Aided Design*, Vol. 82, pp. 79-87, 2017.