

Short Bibliography

Dr. Abdellah El Kacimi is Professor of Applied Mathematics at Cadi University. Previously, he was involved as research-associate at Heriot-Watt University. His main research interests lie in computational modelling, with applications in fluid dynamic, wave problems and high speed railway. He has participated in numerous research projects funded by the European Commission and national agencies.

https://scholar.google.com/citations?user=_hFYAvgAAAAJ&hl=en

Title: **Frequency domain Bernstein-Bézier finite element solver for modelling elastic and electromagnetic short waves**

This talk presents a high-order Bernstein-Bézier finite element (FE) discretisation for the efficient solution of time harmonic elastic and electromagnetic wave problems on unstructured triangular mesh grids. Yet high-order FEs have several benefits over standard FEs, the computational cost to set up the element matrices is a major issue in high-order computations. A key ingredient to address this drawback is to use low complexity procedures in building the local high order FE matrices, by exploiting the tensorial property of Bernstein polynomials and applying the sum factorisation method. To reduce the memory requirements, static condensation of the interior degrees of freedom is performed element-wise.

The performance of the Bernstein-Bézier FEs is assessed on various benchmark tests, within a wide range of frequencies. The obtained results demonstrate the effectiveness of the proposed solver in coping with the pollution error, and its accuracy in resolving high order evanescent wave modes.