MESHLESS AND PARTICLE METHODS

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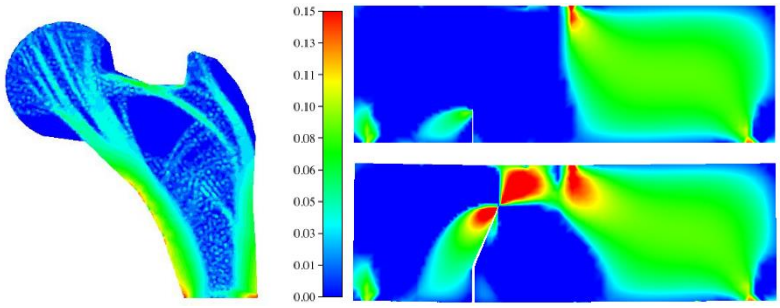
ABSTRACT

Over the past twenty years, meshless and particle methods became one of the major interest focus in computational mechanics. Since then, several meshless techniques were developed and applied to various fields of computational mechanics, and as expected only the most stable and accurate prevailed. Nevertheless, even today there is room for innovation and improvement in the meshless methods field. Within the classical meshless approach, researchers seek daily for more efficient test functions, as well as new numeric integration schemes, capable to provide more stable and accurate solutions. Due to its discretization flexibility and its numeric stability, meshless techniques are suited to analyse demanding phenomena, such as the simulation of fluid flow and fluid/solid interaction in biomechanics or crack tip propagation modelling.



(a) (b)

Figure 1 – Meshless methods in (a) bone tissue remodelling analysis and (b) crack propagation

Nowadays meshless methods, using approximation or interpolation functions, collocation techniques and particle methods are used by the scientific community to solve several engineering problems, from fluid mechanics to biomechanics. The capability of handling efficiently large deformations of the computational mesh and the re-meshing low computational cost explain the variety of scientific fields covered by meshless techniques. This session focuses in the recent development and improvement of existent meshless methods techniques, as well as in the presentation of new meshless approaches and application fields.