

Simulation of ultrasonic testing in metallic components

The object of non-destructive testing techniques is to determine with reliability and at the appropriate scale of observation, the presence and nature of defects in the components of industrial nature. In the specific context of EDF, they contribute to ensuring the integrity of the nuclear plants and they are the main techniques the operator disposes to guarantee the components integrity, in addition to the design and manufacturing ones.

In this talk, I will focus on the well-known counterpart to Eddy current techniques, namely ultrasonic testing, and more precisely to the propagation of ultrasonic waves in real three-dimensional metallic components with heterogeneous anisotropic microstructures and complex geometries. I will try to highlight the numerical challenges that we are facing when one aims to develop a software that can reproduce by simulations such phenomena. Then, I will present the choices that were made with respect to the internal software A3D-CND developed at EDF R&D to finally show some simulation results we obtained.