

Efficient methods for defect detection and classification in non-destructive evaluation of materials

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Ultrasonic non-destructive evaluation of material involves many challenging problems. Nowadays, the behaviour of ultrasound in material is well known and many simulation and reconstruction methods are available from the literature. Nevertheless, the data given by the non-destructive testing method has to be analyzed in a fast and reliable way. In addition, the acquired data is also often very noisy, and has missing information (missing data), because only few measurements can be taken.

In this presentation, it is discussed how topology and methods from persistent homology can be a useful tool for defect detection in ToFD measurements (Time of Flight Diffraction method). Once the defect is detected, we also present an algorithm to separate it from the rest of the Point Cloud Data.