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# Topological derivatives for defect detection in non-destructive testing

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## SUMMARY

Detecting defects embedded in a medium is a problem of paramount interest in a variety of fields, including medical imaging, non-destructive testing of materials and geophysical exploration.

In this talk we present numerical methods based on topological derivative computations for the detection of multiple defects. The method provides an indicator function capable of classifying each point in the region of interest as belonging to the background medium or to an object, without any a priori assumption about the number, size, shape, or location of the objects. The performance of the method in different applications, including acoustic [1, 2], electromagnetic [3], and thermographic inspection [4] will be shown.

**Keywords:** Inverse problems, topological derivative, non-destructive testing

**AMS Classification:** 65N21, 78A46, 35R30

### References

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