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A simple forward direct problem solver for eddy current non-destructive inspection of aluminum plates using uniform field probes

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Outline



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Abstract

In this paper we show that a simple algorithm used to model the eddy current inspection of an aluminum plate can be used to preview the acquired voltage signals. Thus, the algorithm is suitable to work as a forward problem solver to determine the expected measurement signal obtained with a uniform excitation field probe including a giant magnetoresistor sensor. The algorithm is based on a conformal transformation and is able to preview the shape of the electrical current lines when a metallic plate with a superficial straight crack is subject to a sinusoidal excitation field with constant amplitude and orientation in a bounded zone around the sensor element. Simple and fast algorithms as the one presented in this paper are of paramount importance for testing inversion algorithms used to characterize defects in metallic plates.

Highlights

► Non-destructive testing and evaluation. ► Direct problem by conformal mapping. ► Uniform field probe. ► Giant magnetoresistor sensor.

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Keywords

Eddy currents; Non-destructive testing; Uniform field probes; Giant magnetoresistors

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