Usage of Permanent Magnets in Reconstructing of Flaws in Ferromagnetic Materials

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Abstract. The flaw reconstruction based on changes in the *B-H* characteristic is performed by employing a static magnetic field produced by permanent magnets. This has the advantage of using higher values of field intensities inside the investigated bodies which, in previous devices, would require increased current densities in field coils or inside the bodies. The dependence between the flaw vectors and the magnetic flux density at the measurement points is practically linear for small modifications in the *B-H* relationship. It is expressed through a matrix *T*, whose entries are obtained by solving direct problems. The method of reconstruction is based on a half-deterministic procedure where a well enough conditioned submatrix is extracted from *T*. The unknowns associated with this submatrix can easily be obtained from the rest of the unknowns, which are tested in order to obtain the smallest error.

Keywords: NDT, permanent magnet, inverse problems, half-deterministic methods

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