RAPID CALCULATION OF EDDY CURRENT TEST SIGNALS DUE TO CRACKS IN TUBES

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We have developed a fast computational model for calculating the signals due to cracks in tubes to simulate inspections using bobbin coils and pancake coils. The coils can be arranged in any combination to represent differential probes, driver pick-up arrangement, or remote field inspections. The low computational cost is achieved without sacrificing accuracy by using semi-analytical methods. Controlled validations are carried out to high precision by comparing the predictions of coil impedance directly with precise impedance analyzer measurements without using calibration samples or scaling the data in any way. As a result, we generate predictions that are orders of magnitude faster than can be achieved using brute force numerical methods. In addition, we have demonstrated the reliability and accuracy of the results.