

DEPTH FORMULA IN ANOMALY DETECTION; INDEPENDENT ON ANOMALY SIZE AND ADMITTIVITY CONTRAST

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ABSTRACT

The trans-admittance mammography (TAM) was introduced to improve spatial resolution of impedance imaging for reliable detection of malignant breast tumors. In this model, the breast is placed in between two electrical plates which is similar to X-ray mammography configuration. The top plate is a large single voltage applying electrode and the bottom plate, whose potential is kept at ground, consist of many sensing point electrodes arrayed in rectangular shape. The corresponding inverse problem is to determine the anomalies from frequency difference Neumann data measured at bottom sensing electrodes. In order to obtain accurate position estimation of anomaly, it is preferable to have formulas which are independent of the size and admittivity contrast. In the case of a simplified breast model with spherical shape anomaly, we establish formulas for determination of its depth; the formula is independent of size and admittivity contrast. Furthermore, numerical simulation successfully shows the feasibility of the proposed tumor estimating analysis.