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1201 West University Drive, Edinburg, TX 78539. *Inverse Problem in Optical Tomography.*

Near infrared (NIR) optical imaging is a developing diagnostic tool for cancer screening. A novel image reconstruction (inverse problems) algorithm was developed and was formulated as a nonlinear least-squares-type simple bounds constrained optimization problem. Reconstruction problem is ill-posed. To make the reconstruction problems well-posed, the penalty modify barrier function method (PMBF) is used instead of Tikhonov regularization technique. The accuracy and the rapid convergence of the PMBF method require a good initial guess of the Lagrange multipliers. To obtain the initial guess of the multipliers, we use a least square unconstrained minimization problem. Three dimensional images are reconstructed from contact and noncontact experimentally measured data with good accuracy. (Received December 11, 2013)