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Elasto-mammography: Theory, Algorithm, and Phantom Study

Z. G. Wang,¹ Y. Liu,² L. Z. Sun,³ G. Wang,² and L. L. Fajardo²

¹Department of Civil and Environmental Engineering, The University of Iowa, Iowa City 52242, IA, USA

²Department of Radiology, The University of Iowa, Iowa City 52242, IA, USA

³Department of Civil and Environmental Engineering, University of California, Irvine 92697, CA, USA

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Abstract

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Abstract

A new imaging modality framework, called elasto-mammography, is proposed to generate the elastograms of breast tissues based on conventional X-ray mammography. The displacement information is extracted from mammography projections before and after breast compression. Incorporating the displacement measurement, an elastography reconstruction algorithm is specifically developed to estimate the elastic moduli of heterogeneous breast tissues. Case studies with numerical breast phantoms are conducted to demonstrate the capability of the proposed elasto-mammography. Effects of noise with measurement, geometric mismatch, and elastic contrast ratio are evaluated in the numerical simulations. It is shown that the proposed methodology is stable and robust for characterization of the elastic moduli of breast tissues from the projective displacement measurement.