Category: Tissue Characterization

Non-invasive Characterization of Tissue by Surface Wave Generated by Ultrasound Transducer

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Abstract—Surface acoustic wave (SAW) shows great capacity in non-destructive mechanical characterization, which promises a fairly good chance to realize the non-invasive pathologic diagnosis of cirrhosis cutaneous and subcutaneous tissues. This paper proposes a rapid way to evaluate the elastic property of layering featured tissue by phase velocity dispersion. An ultrasound transducer with 1 MHz resonant frequency is fabricated and used to generate SAWs by impulses stimulus. A laser-vibrometer with displacement decoding mode is used to detect the SAWs. The bandwidth of SAWs is determined as 1.2 kHz with a frequency cutoff of 20dB. The phase velocity of SAWs on a 5% agar phantom is estimated as 25 m/s. Meantime, a criteria of how to select the right spectrum range for the accurate calculation of phase velocity dispersion is proposed.