



Project Proposal

Coded Excitation Approach to Medical Ultrasound Part 2

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Sonography techniques use multiple transducer elements for tissue visualization by radiating it with acoustic energy. The image is typically comprised of multiple scanlines, obtained by sequential insonification of the medium using focused beams. Modern imaging systems use single-carrier short pulses for transducer excitation, while the usage of more sophisticated signals can be beneficial in terms of SNR, penetration depth and frame rate. These parameters are extremely valuable in medical ultrasound imaging. Coded signals are successfully used in such areas as radar and communication systems. The application of this approach to ultrasound is challenging due to imaging and not detection nature of ultrasound, its high dynamic range and frequency dependent attenuation.

In this project methods for coded excitation adopted from the radar processing will be incorporated to frequency domain beamforming (FDBF) framework developed recently at SAMPL. Performance of modified FDBF will be simulated using k-Wave simulation tool running in Matlab environment.

Required background: Introduction to Digital Signal Processing (044198)

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