

Recent developments in adaptive beamforming

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Beamforming is a key technology determining ultrasound image quality. Phase-aberration correction had been studied extensively for improvement of focusing quality. Through such investigations, adaptive beamforming gained attention in the 2000s owing to the availability of the digital beamformer. Coherence-based adaptive beamforming and minimum variance beamforming were introduced in medical ultrasound imaging and have shown to improve image quality significantly. Those beamformers have been studied extensively by a number of researchers. Various methods have been developed for improvement of the performance of those beamformers and, also, some new adaptive beamforming methods have been developed. More recently, programmable ultrasound scanners have opened the era of software beamforming. Adaptive methods are increasingly important to reach the fullest potential in software beamformers. In this talk, adaptive beamformers that have been introduced in medical ultrasound imaging since the 2000s will be summarized briefly, and recent developments in adaptive beamforming will be presented. Adaptive beamforming significantly improves image quality, though its computational cost still presents a problem to use it in clinical situations. Recent studies to overcome such issues will also be presented.