

# ACOUSTICS2008/265

## Surround Sound Echo Cancellation in the Spherical Harmonic Domain

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The problem of creating a multi-user hands-free immersive telecommunications environment poses many challenges for acoustic signal processing. The most pressing is the creation of a fast multi-channel acoustic echo canceller (MCAEC) to eliminate acoustic feedback created in the speaker-microphone loop. Traditional multi-channel adaptive algorithms for echo cancellation are not fast enough to work in systems with highly correlated multi-channel signals like those found in the traditional telecommunications setup. This work presents analysis of a proposed acoustic echo cancellation system that operates in the spherical harmonic domain. Transforming the microphone and speaker signals into the spherical harmonic domain reduces both the number of channels and the correlation between channels for faster convergence of the adaptive MCAEC filters. This method also has the added benefit of being independent of the microphone and speaker array configuration, resulting in a hybrid mono/stereo/multi-channel acoustic echo canceller. This work is funded by NSF Grant IIS-0534221.