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estimation of maximum stable gain in a hearing aid

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Feedback cancellation (FBC) algorithms have become an important part of hearing aids, allowing the Maximum Stable Gain (MSG) to be increased by up to 25 dB beyond what is possible without an FBC. Although FBC algorithms have improved the usability of hearing aids, it is difficult to predict the MSG for a given individual with a particular hearing aid. Knowledge of this information would enable the audiologist to make more informed decisions regarding the appropriateness of a hearing aid/earmold, and it could be used to counsel the patient regarding feedback.

A method of estimating the MSG of a hearing aid with and without an FBC will be presented. The method uses a finite impulse response filter to approximate the acoustic path. The filter coefficients are estimated during the initialization of the FBC. From these filter coefficients, the MSG for the hearing aid with and without FBC are calculated. This method has been implemented in the firmware and fitting software. Using a variety of device styles, microphone modes and feedback paths, it has been verified that the estimated MSG matches the actual MSG within 6 dB for 90% of hearing aids.