Abstract:
The aim of the present study was to compare distortion product otoacoustic emissions (DPOAEs) to loudness with regard to the potentiality of DPOAEs to determine characteristic quantities of the cochlear-impaired ear and to derive objective hearing aid parameters. Recently, Neely et al. [J. Acoust. Soc. Am. 114, 1499-1507 (2003)] compared DPOAE input/output functions to the Fletcher and Munson [J. Acoust. Soc. Am. 5, 82-108 (1933)] loudness function finding a close resemblance in the slope characteristics of both measures. The present study extended their work by performing both loudness and DPOAE measurements in the same subject sample, and by developing a method for the estimation of gain needed to compensate for loss of cochlear sensitivity and compression. DPOAEs and loudness exhibited similar behavior when plotted on a logarithmic scale and slope increased with increasing hearing loss, confirming the findings of Neely et al. To compensate for undesired nonpathological impacts on the magnitude of DPOAE level, normalization of DPOAE data was implemented. A close resemblance between gain functions based on loudness and normalized DPOAE data was achieved. These findings suggest that DPOAEs are able to quantify the loss of cochlear sensitivity and compression and thus might provide parameters for a noncooperative hearing aid adjustment.