Modeling of Lossy Inductance in Moving-Coil Loudspeakers

The electrical impedance of moving-coil loudspeakers is dominated by the lossy inductance in high frequency range. Using the equivalent electrical circuit method, a new model for the lossy inductance based on separate functions for the magnitude and phase of the impedance is presented. The electrical impedances of five loudspeakers were measured by Klippel LPM analyzer, and the model parameters were identified by fitting the measured impedance curve. The obtained accuracy was evaluated with respect to the simplicity of different models. The results show that, this new model agrees well with the measured electrical impedance, and gives an accurate prediction of the lossy inductance varying with frequencies, especially for the frequency dependent phase. Additionally, there are just three parameters in this new model, which gives simple and rapid parameter identification.