Digital Compensation of Loudspeaker Distortion

Report

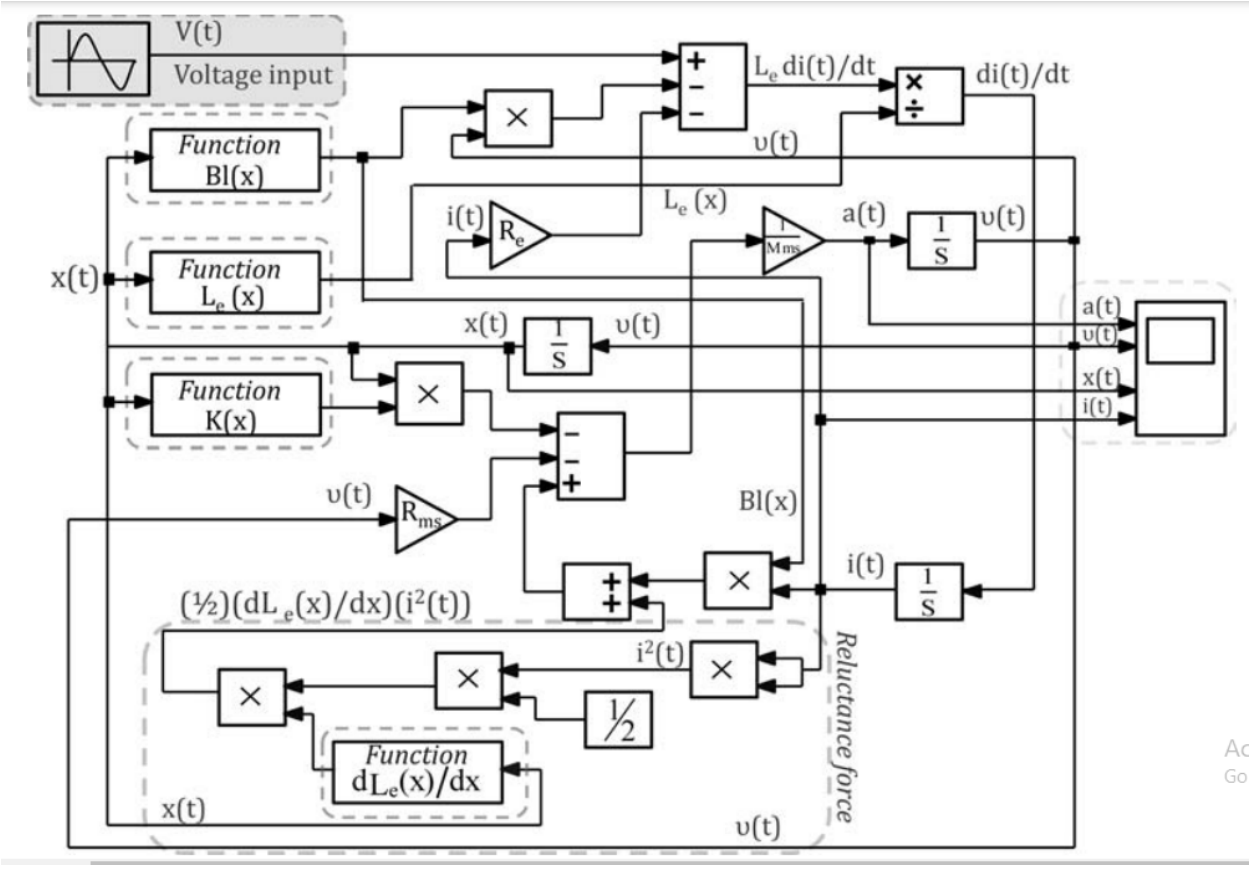
Simulating Real World Speaker

INTRODUCTION

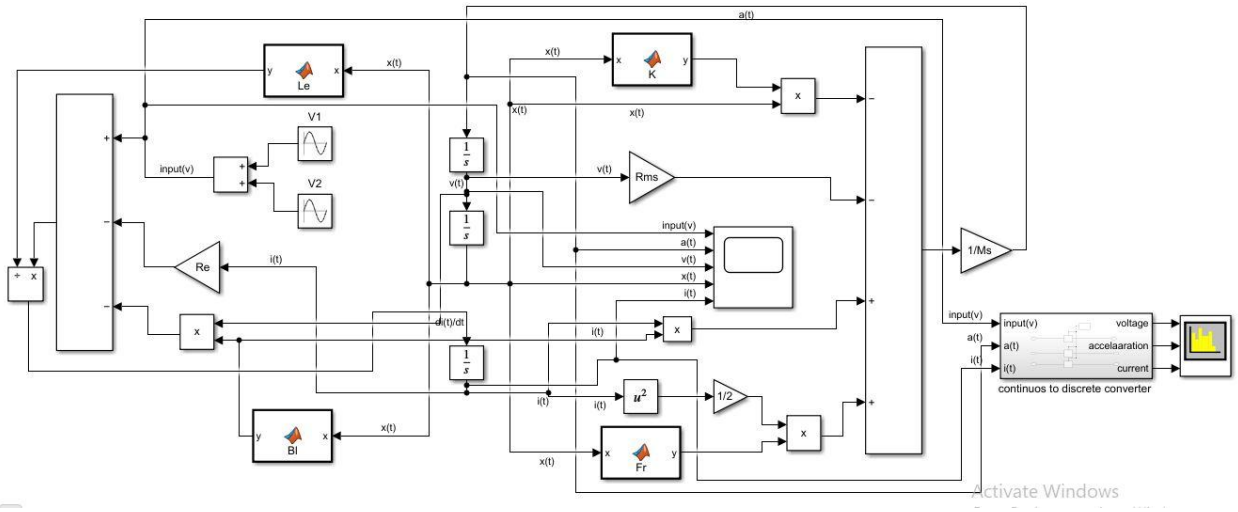
simulating speaker model in simulink with both linear and nonlinear limitations of electric, magnetic, mechanical properties such as resistance ,self inductance of coil, magnetic induction, elastic nature of diaphragm, magnetic force, reluctance force, displacement, velocity, acceleration of diaphragm, damping factor etc using a reference research paper called **Versatile Model of Nonlinear Electrodynamic Loudspeaker Co-Operating with the Amplifier Designed by Way of Advanced Software**

MODEL

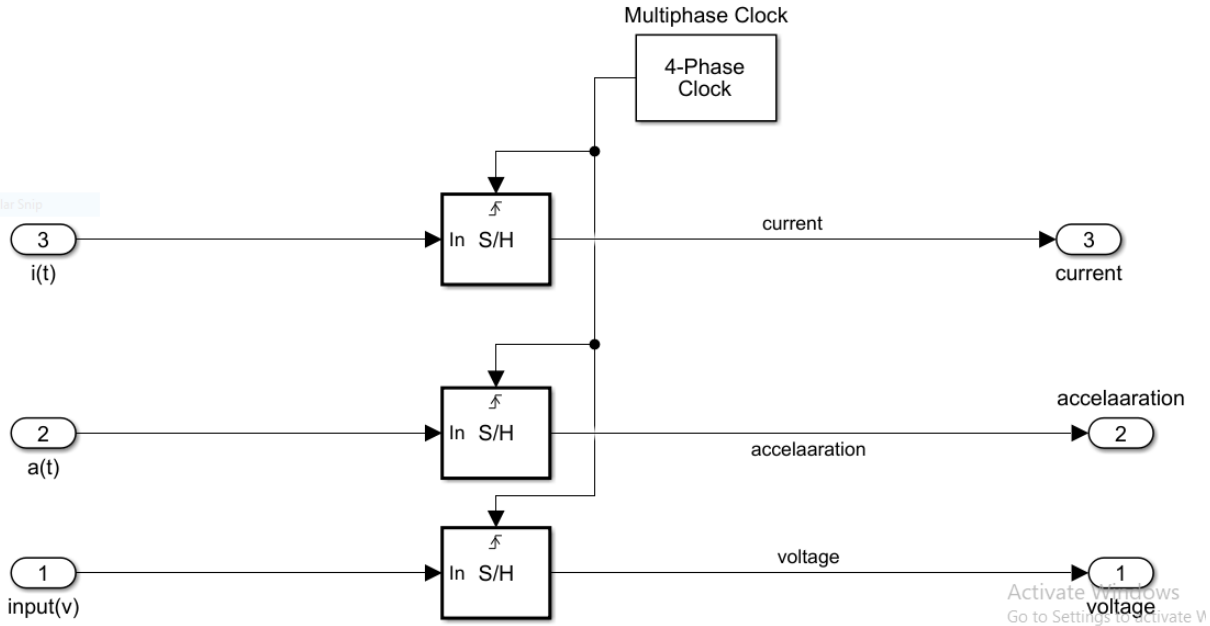
Research paper Model



Our Model



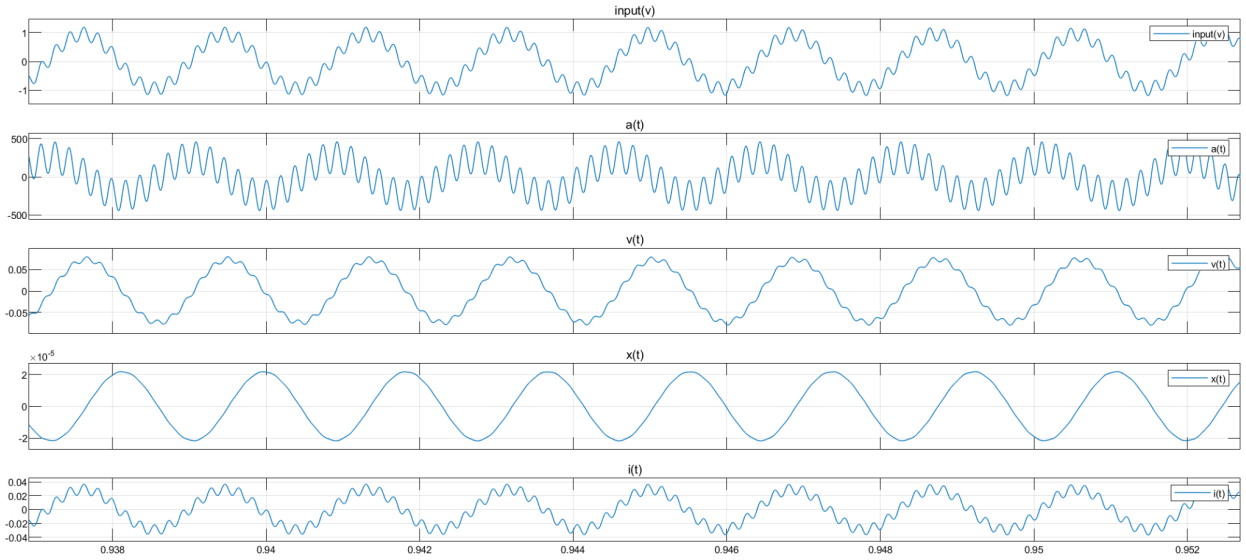
Continuous to Discrete converter(sub system)



I/O waveform

Input given to the speaker model is a two-tone driving signal which is constructed with two straight forward sinusoidal components with different frequencies used for understanding frequency response of our model

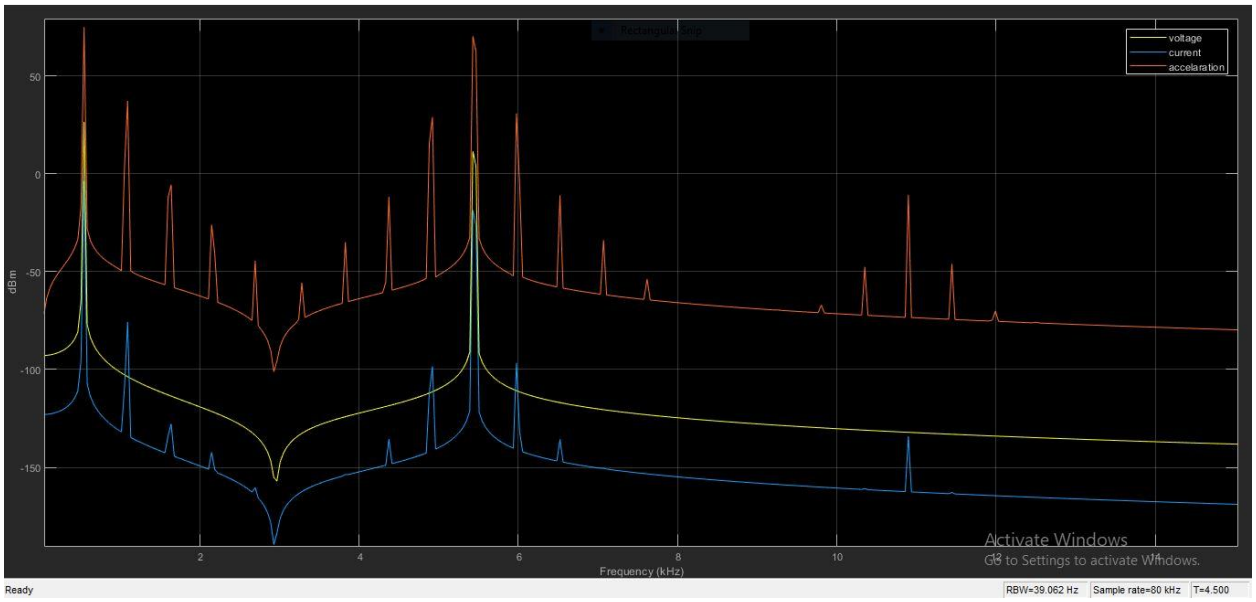
Vin = V1 *sin(2*f1*t) + V2* sin(2*f2*t)



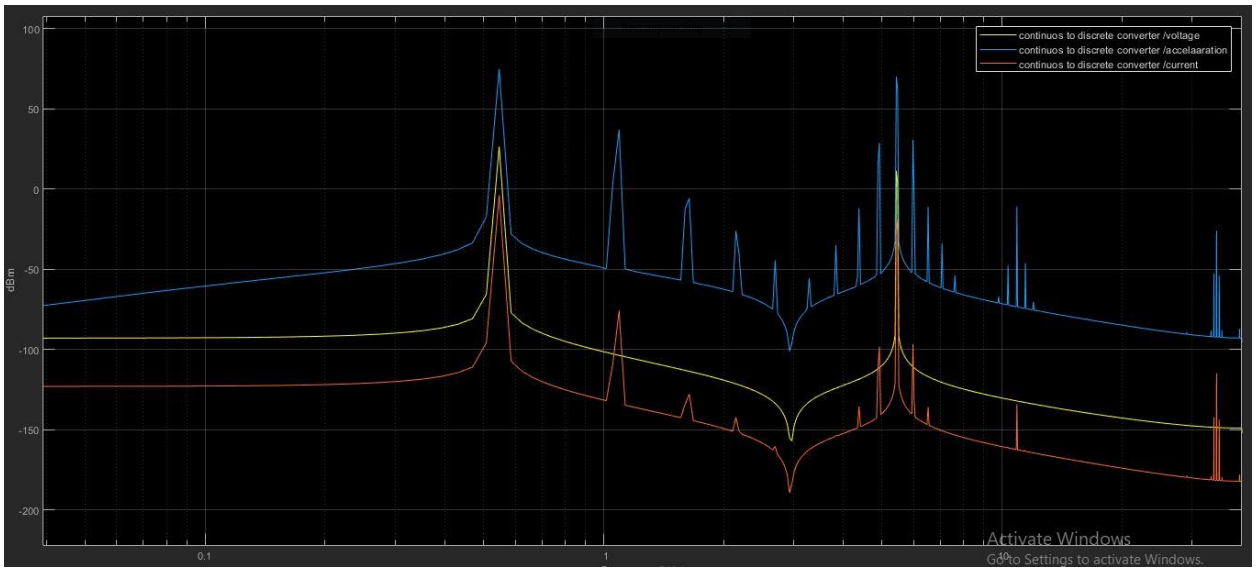
From the above graph we can see that current and acceleration have a similar waveform as input voltage. We cannot identify any noise generated visibly here so will be checking its frequency response for finding if there is noise generated or not.

FREQUENCY RESPONSE

Linear



Logarithmic



LINKS

Initial Report

Files

Reference

INFERENCE

In frequency response of current and acceleration we can see noises generated which were not present in the input voltage

We got the distortion in sound while simulating real world speaker and we found that noises are frequency harmonics of the input waves which are causing the distortion in sound