

EE344 - EOL  
Assignment (submit by 20/4/21)

Problem: Design an analog compensator circuit for a noise cancelling headphone.

Setup:

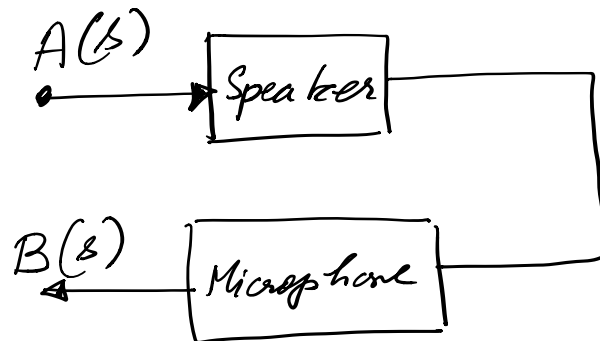


Fig 1: System ID

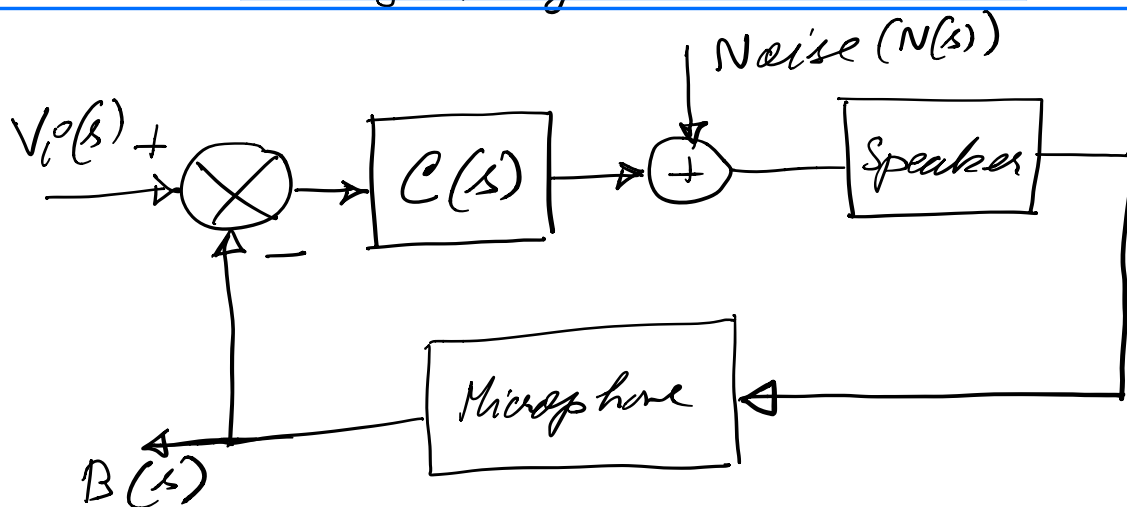


Fig 2: Noise Cancelling Experiment Setup.

Data: In Fig 1, the Bode plot for the transfer function  $\frac{B(s)}{A(s)}$  is given in the attached Excel file.

Specs: 1) In Fig 2, the t.f.  $\left[ \frac{B(s)}{N(s)} \right]$  should have at least 20 dB attenuation at 100 Hz.

2) In Fig 2, the t.f.  $\left[ \frac{B(s)}{V_i^o(s)} \right]$  should have 0 dB gain over the widest possible freq. range.

3)  $\left[ \frac{B(s)}{V_i^o(s)} \right]$  should be stable with adequate G.M. & P.M.

Problem: 1) Design the transfer f<sup>n</sup>  $\frac{C(s)}{C(s)}$  to meet the above specs.

2) Design an analog ckt

implementation of  $C(s)$  and  
verify that the Bode plots  
of the designed analog ckt.  
matches those of the designed  
 $C(s)$ , using your favourite  
ckt. simulator (e.g. SPICE)