



Software : by Martin J. King
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Unit and Constant Definition

cycle := 2·π·rad

Air Density : ρ := 1.21·kg·m⁻³

Hz := cycle·sec⁻¹

Speed of Sound : c := 342·m·sec⁻¹



Part 1 : Thiele-Small Consistent Calculation

Abbreviated User Input (Edit This Section and Input the Parameters for the System to be Analyzed)

Series Resistance

R_{add} := 0.0·Ω

Driver Thiele / Small Parameters : **Jordan JX125 OEM Driver Properties**

f_d := 48·Hz

V_{ad} := 15.85·liter

Adjustments

R_e := 6.6·Ω

Q_{ed} := .824

R_{ew} := R_e + R_{add}

L_{vc} := .465·mH

Q_{md} := 3.5

Q_{edw} := Q_{ed}·R_e·(R_e - R_{add})⁻¹

Bl := 6.386· $\frac{\text{newton}}{\text{amp}}$

Q_{td} := $\left(\frac{1}{Q_{ed}} + \frac{1}{Q_{md}}\right)^{-1}$

S_d := 132·cm²

Q_{td} = 0.667

Enclosure Geometry Definition : Model of Internal Air Volume for typical 48" MLTL

L_w := 46.0·in

(Internal Height)

z_{driver} := 15.5·in

(Driver Internal Distance From Top < Height)

z_{port} := 44·in

(Port Internal Distance From Top < Height)

S₀ := 30.0·in·10·in

(Internal Area of the Top End, z = 0)

S_L := 30.0·in·10·in

(Internal Area of the Bottom End, z = L)

Density := 0.25·lb·ft⁻³

(Stuffing density : 0 lb/ft³ < D < 1 lb/ft³)

r_{port} := 1.5·in

(Inside Radius of the Port)

L_{port} := 2.0·in

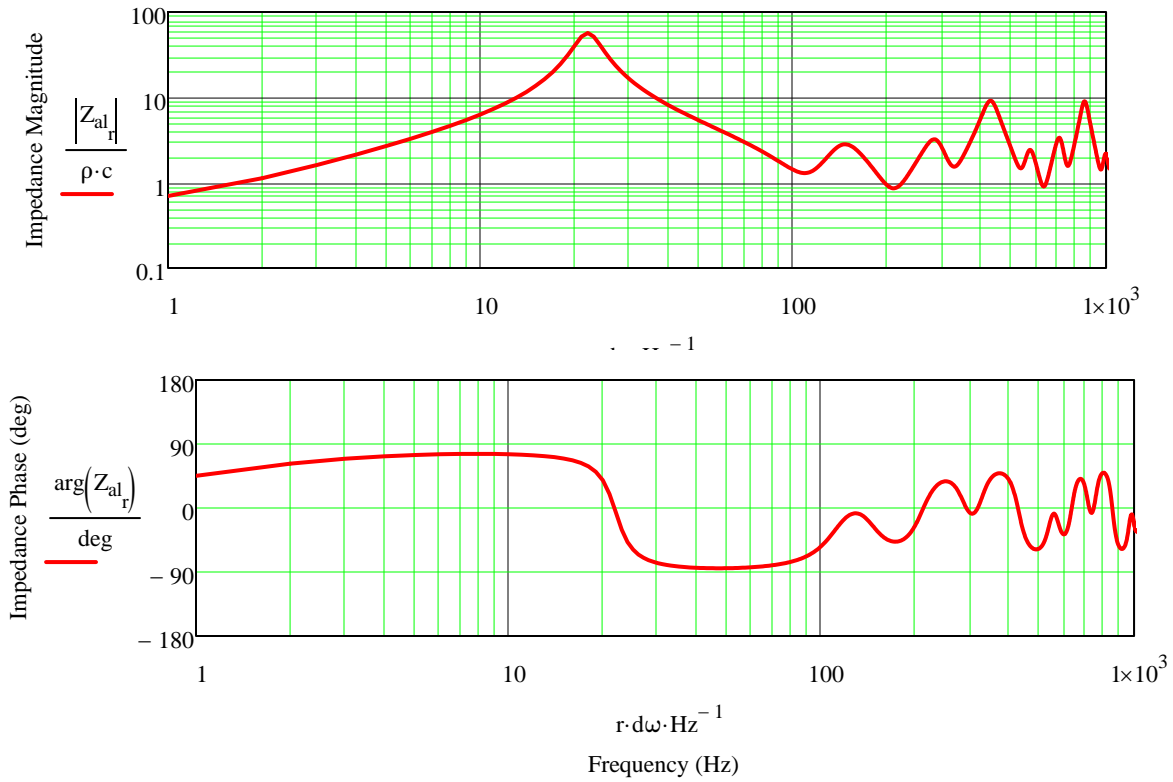
(Length of the Port)

Power := 1·watt

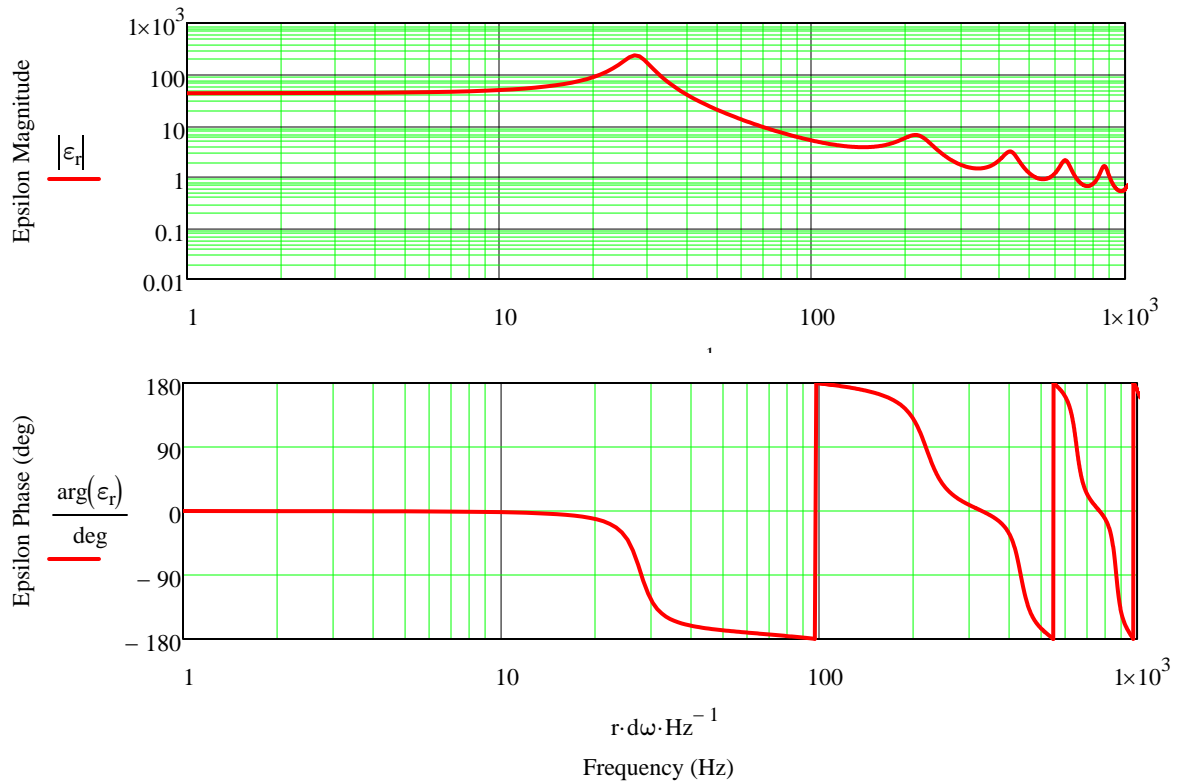
(Input Power) Applied Voltage Reference ---> R_{ref} := 8·Ω

End of Abbreviated User Input

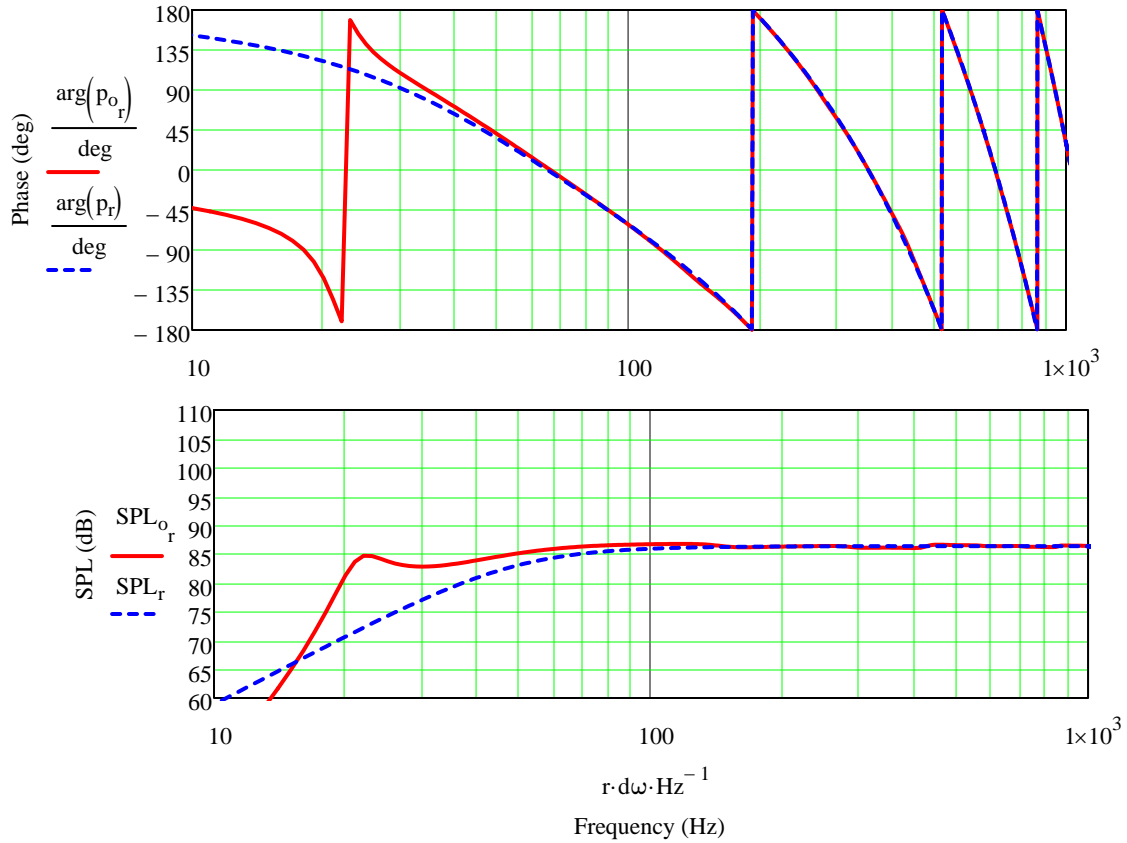
Resulting Acoustic Impedance for the Enclosure



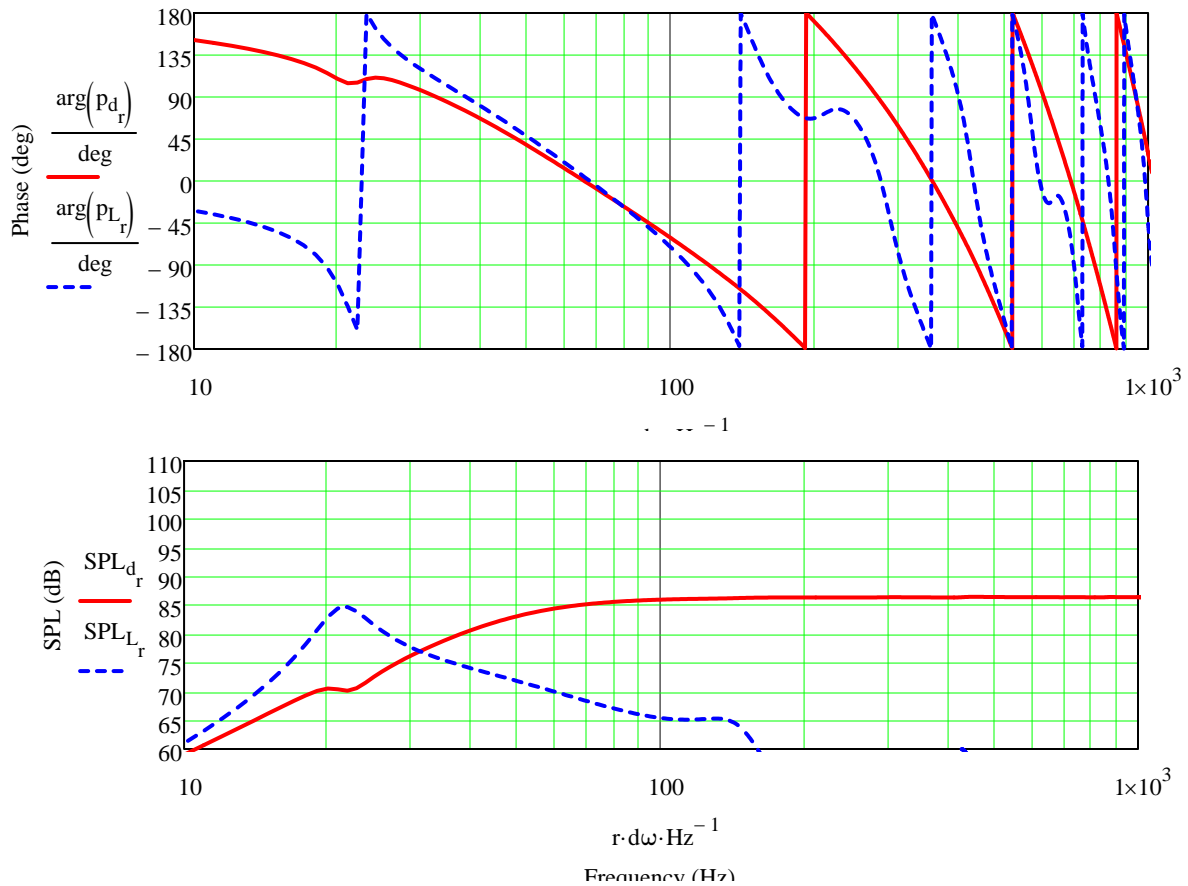
Velocity at the Terminus of the Ported Box for a 1 m/sec Excitation at the Driver Position



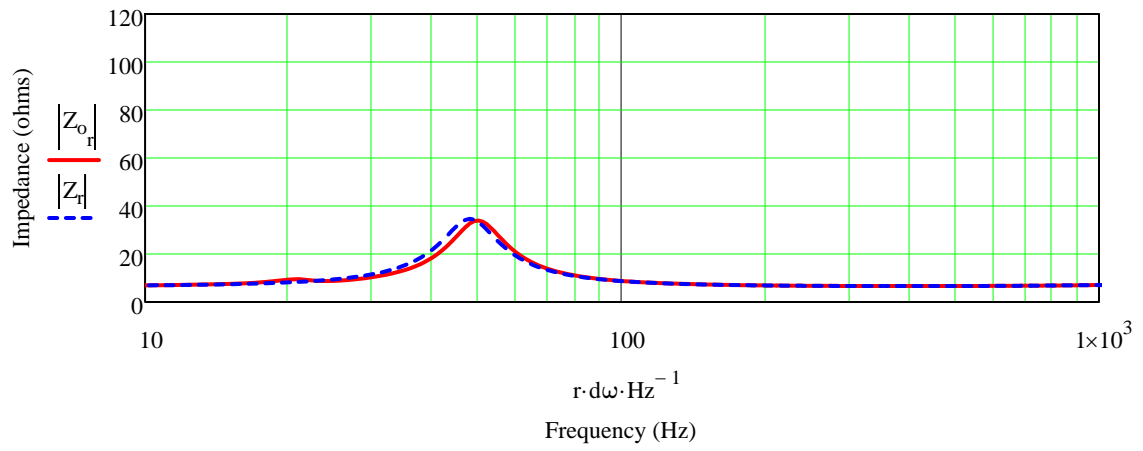
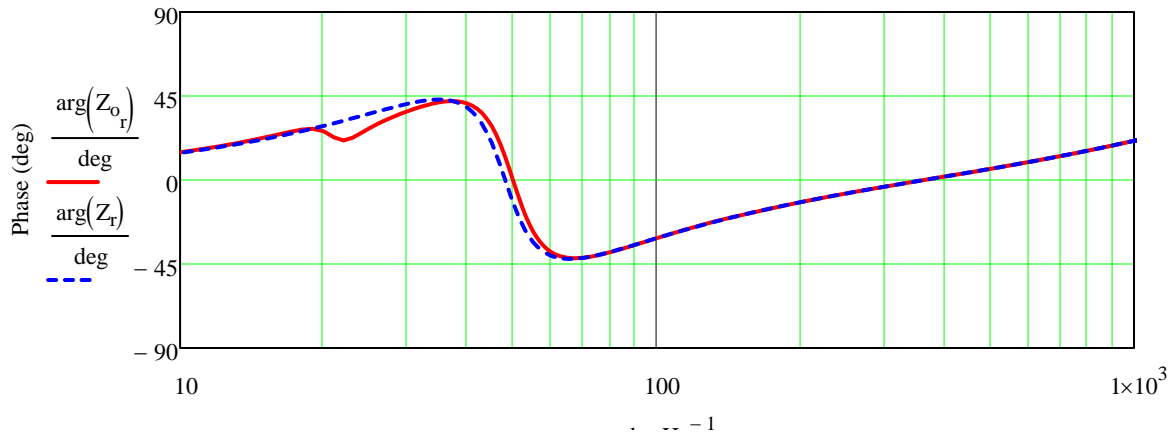
Far Field Ported Box System and Infinite Baffle Sound Pressure Level Responses



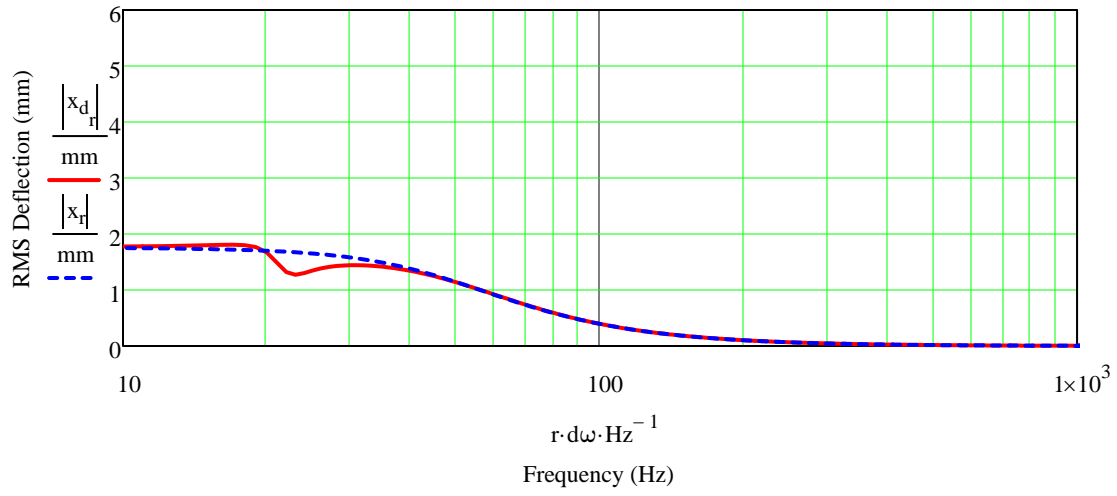
Woofer and Terminus Far Field Sound Pressure Level Responses



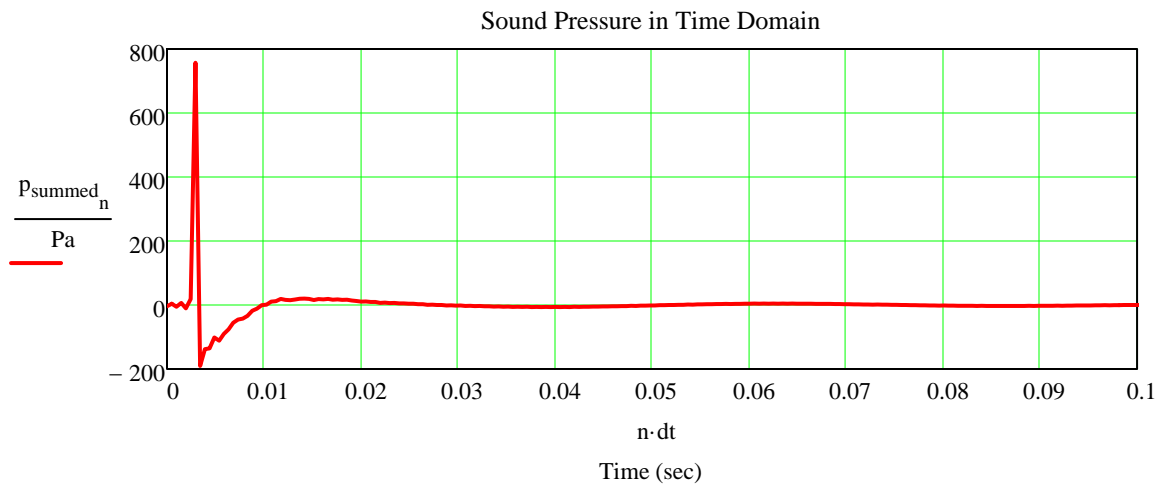
Ported Box System and Infinite Baffle Impedance



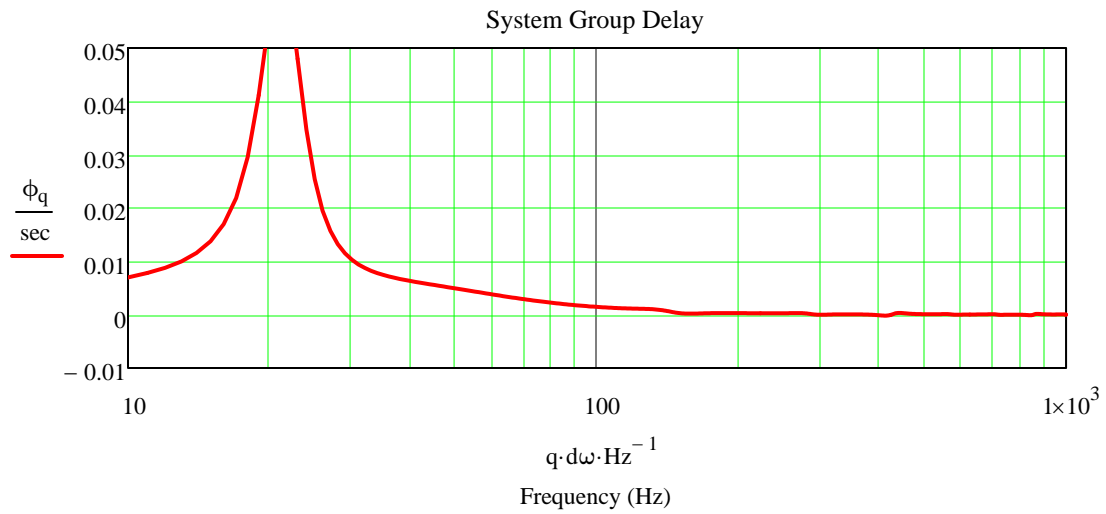
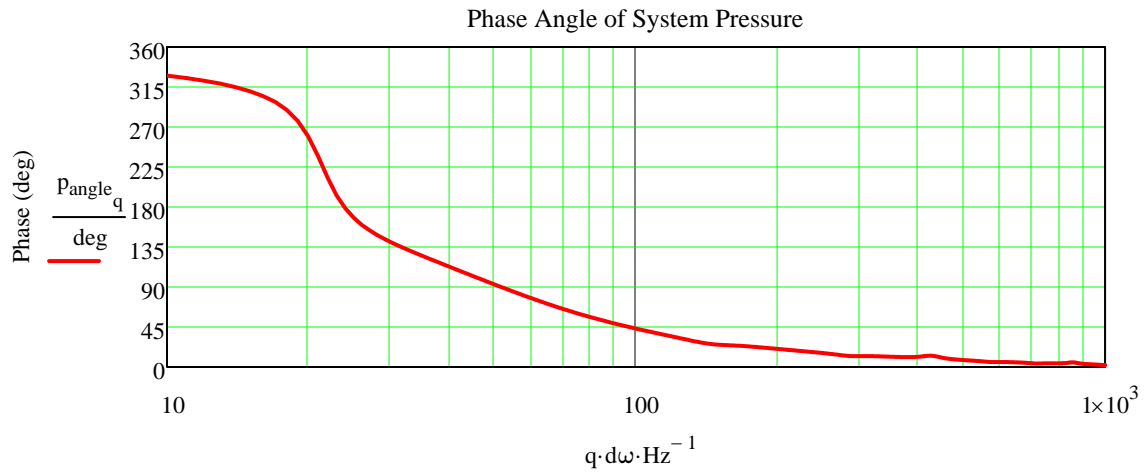
Woofer RMS Displacement



System Time Response for an Impulse Input



System Group Delay



Port Air Velocity (should be $< 10 \text{ m/sec} / 342 \text{ m/sec} = \underline{0.03}$)

