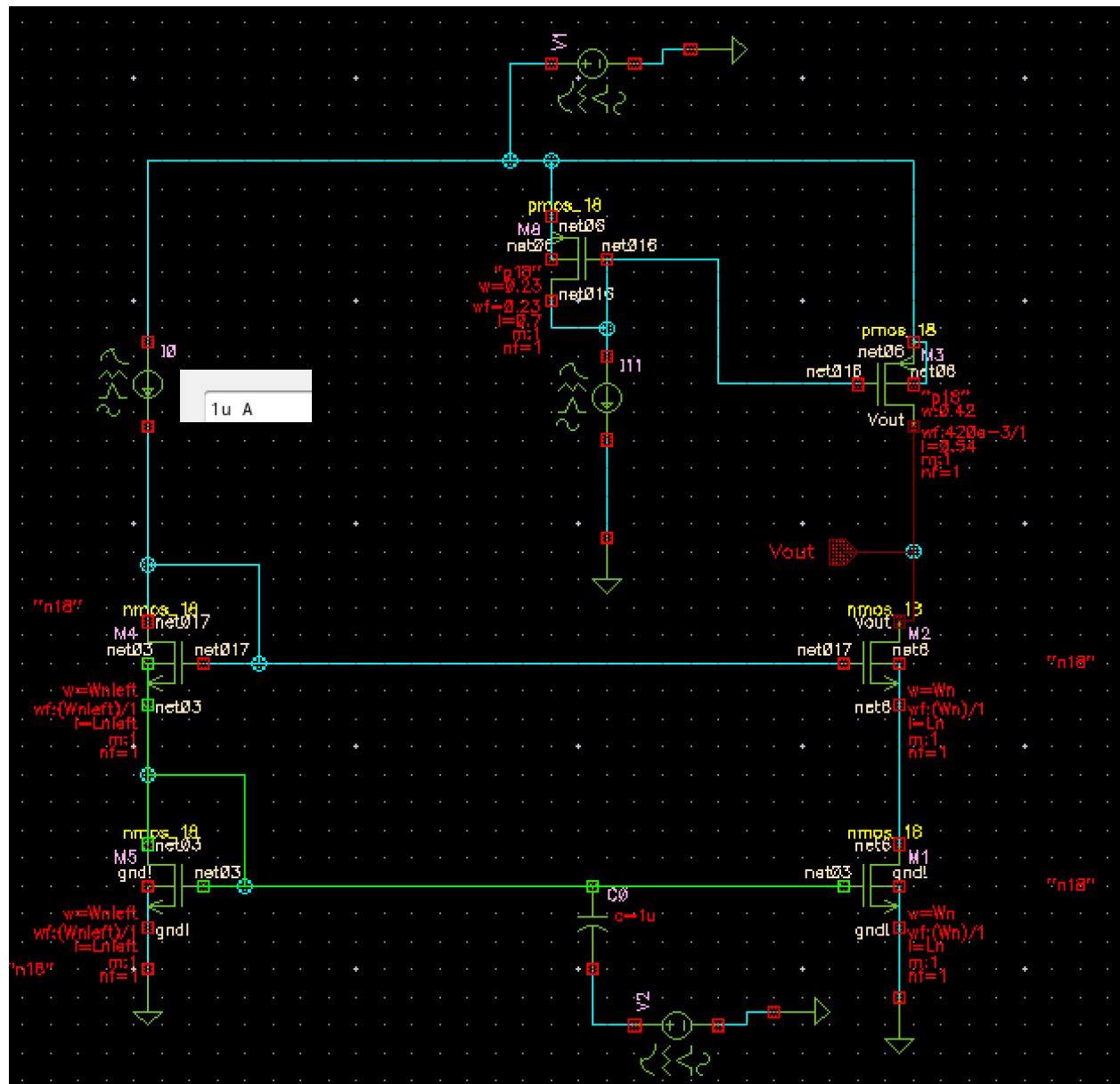
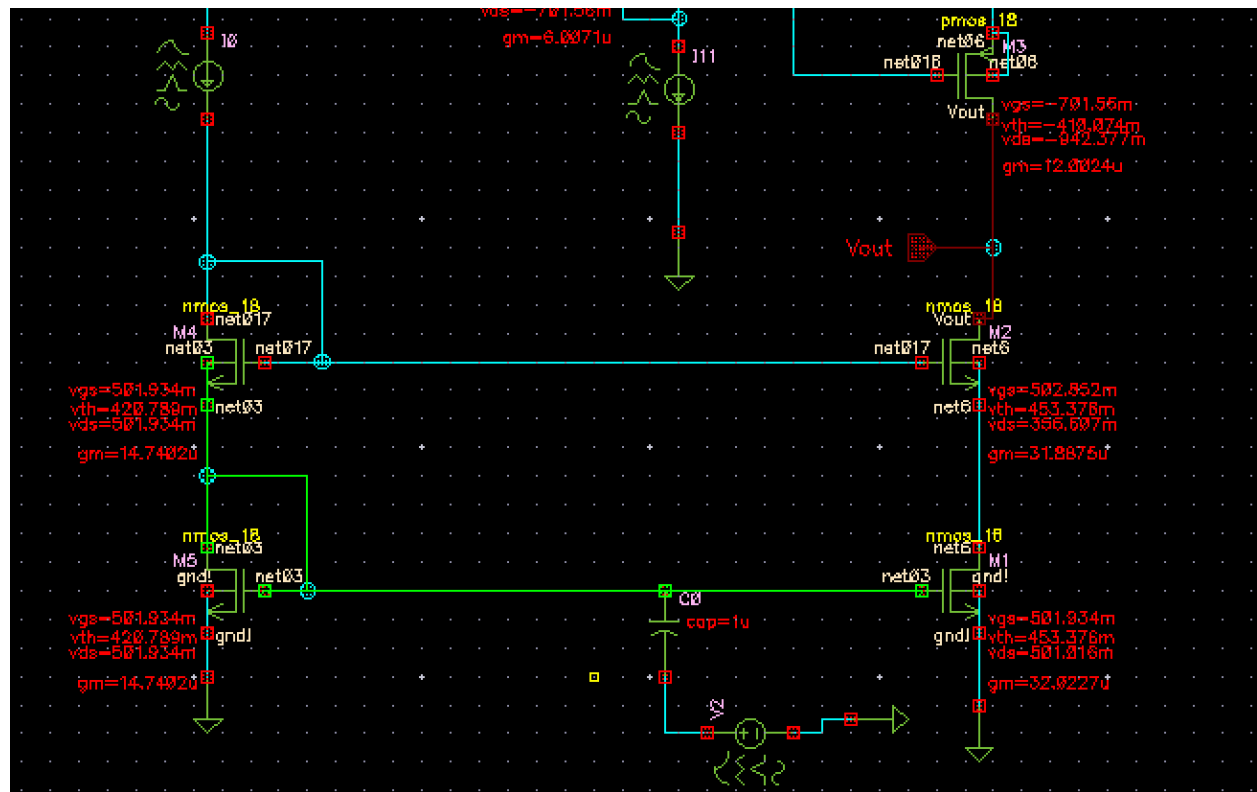


1st question:



- Here i used cascode CS amplifier to increase the output impedance (which increases gain)
- Used pmos (in saturation) as resistor connecting VDD to Vout
- For biasing the above pmos i used I to V converter which is diode connected Pmos

Dc operating point:



ADL

ADE L (1) - assignment_3 q1_laptop schematic (on vlsi.iitgn.ac.in)

Launch Session Setup Analyses Variables Outputs Simulation Results Tools Calibre Help

Design Variables

Name	Value
1n	540m
2nleft	540m
3vn	1.26
4vnleft	420m

Analyses

Type	Enable	Arguments
1ran	<input checked="" type="checkbox"/>	0 1
2lc	<input checked="" type="checkbox"/>	t

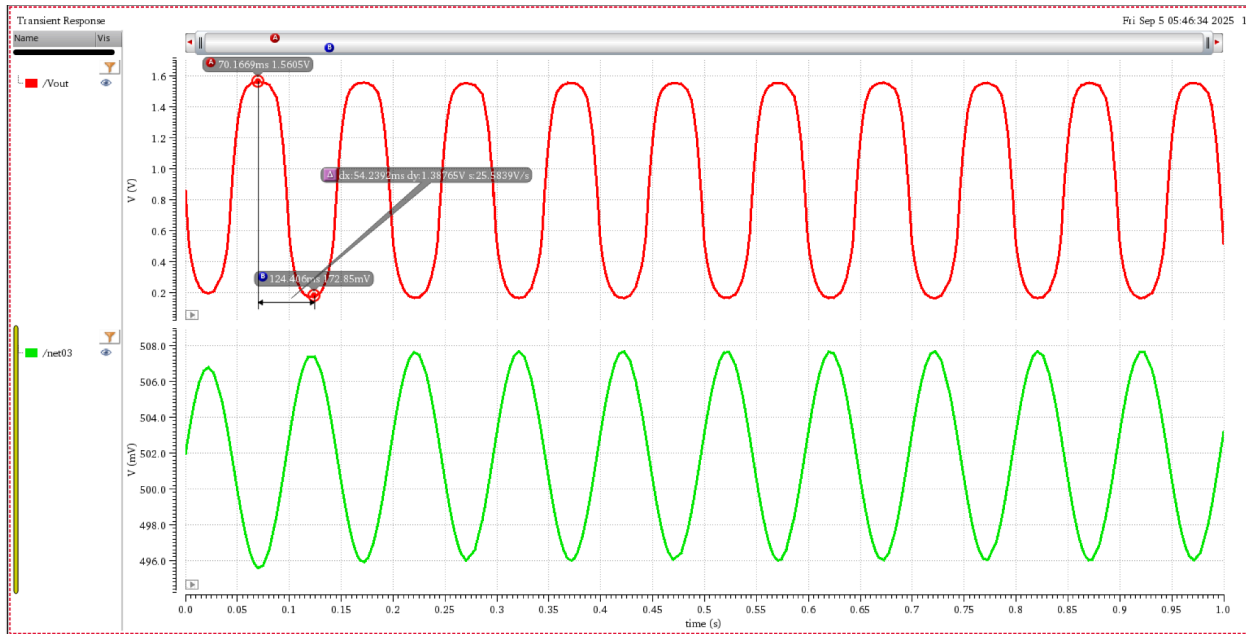
Outputs

Name/Signal/Expr	Value	Plot	Save	Save Options
1 Vout		<input checked="" type="checkbox"/>	<input type="checkbox"/>	allv
2 net03		<input checked="" type="checkbox"/>	<input type="checkbox"/>	allv

Plot after simulation: Auto Plotting mode: Replace

> Results in /home/sahasrith/simulation/q1_lap

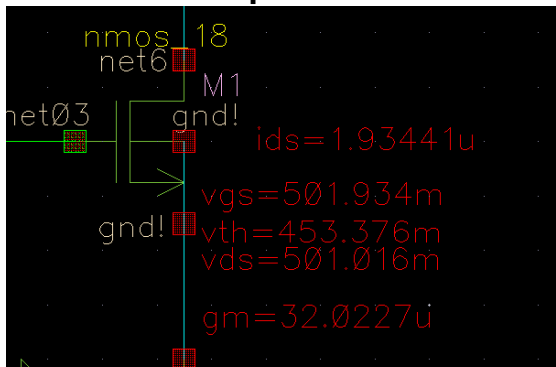
2(3) Load State ... Status: Ready T=27 C Simulator: spectre State: state1



$$\frac{1.38765}{0.012} = 115.6375$$

Gain = $1.38765 / 0.012 = 115.637 > 200V/V$

Power consumption



$$(1 \times 10^{-6} + 1.93 \times 10^{-6})(1.8) = 0.000005274$$

~ Which is less than 10uW

2nd question

Apply To: ☒ only current ☒ instance

Show: ☐ system ☒ user ☒ CDF

Browse Reset Instance Labels Display

Property	Value	D
Library Name	analogLib	off
Cell Name	vsources	off
View Name	symbol	off
Instance Name	V2	off

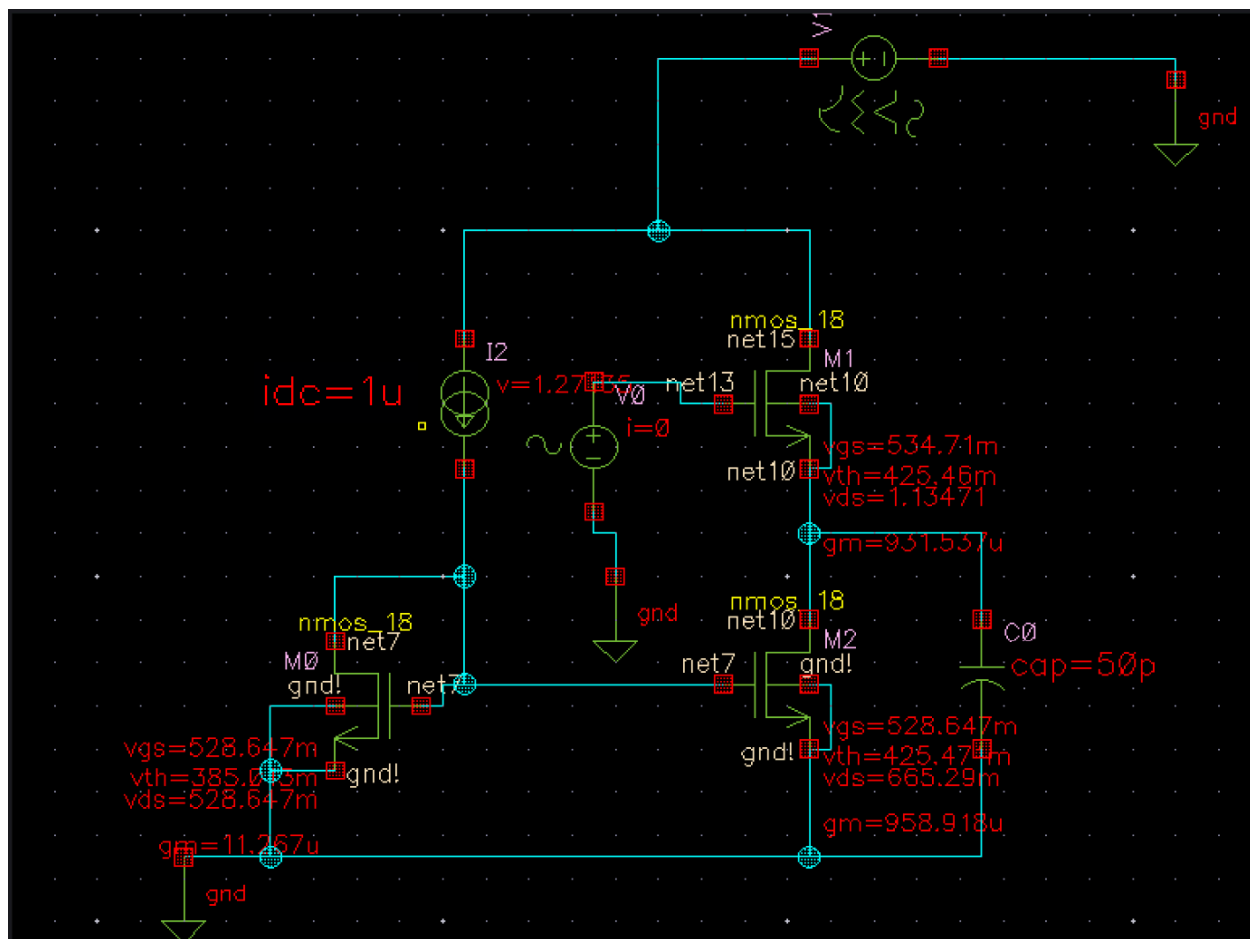
Add Delete Modify

User Property	Master Value	Local Value	D
Ivignore	TRUE		off

CDF Parameter Value D

DC voltage	0 V	off
Source type	sine	off
Frequency name 1		off
Frequency 1	10 Hz	off
Amplitude 1 (Vpk)	6m V	off
Phase for Sinusoid 1		off
Sine DC level		off
Delay time		off

2nd question: Schematic



ADE L (5) - assign_3 CD schematic@vlsi.iitgn.ac.in

Launch Session Setup Analyses Variables Outputs Simulation Results Tools Calibre Help

Design Variables

Name	Value

Analyses

Type	Enable	Arguments
1 dc	<input type="checkbox"/>	t
2 ac	<input type="checkbox"/>	1 1M Automatic Start-Stop
3 tran	<input checked="" type="checkbox"/>	0 5m moderate

Outputs

Name/Signal/Expr	Value	Plot	Save	Save Options
1 net18		<input checked="" type="checkbox"/>	<input type="checkbox"/>	allv
2 net15		<input checked="" type="checkbox"/>	<input type="checkbox"/>	allv
3 Phase		<input type="checkbox"/>	<input type="checkbox"/>	
4 Gain		<input type="checkbox"/>	<input type="checkbox"/>	
5 gain(dB)		<input type="checkbox"/>	<input type="checkbox"/>	
6 power		<input type="checkbox"/>	<input type="checkbox"/>	

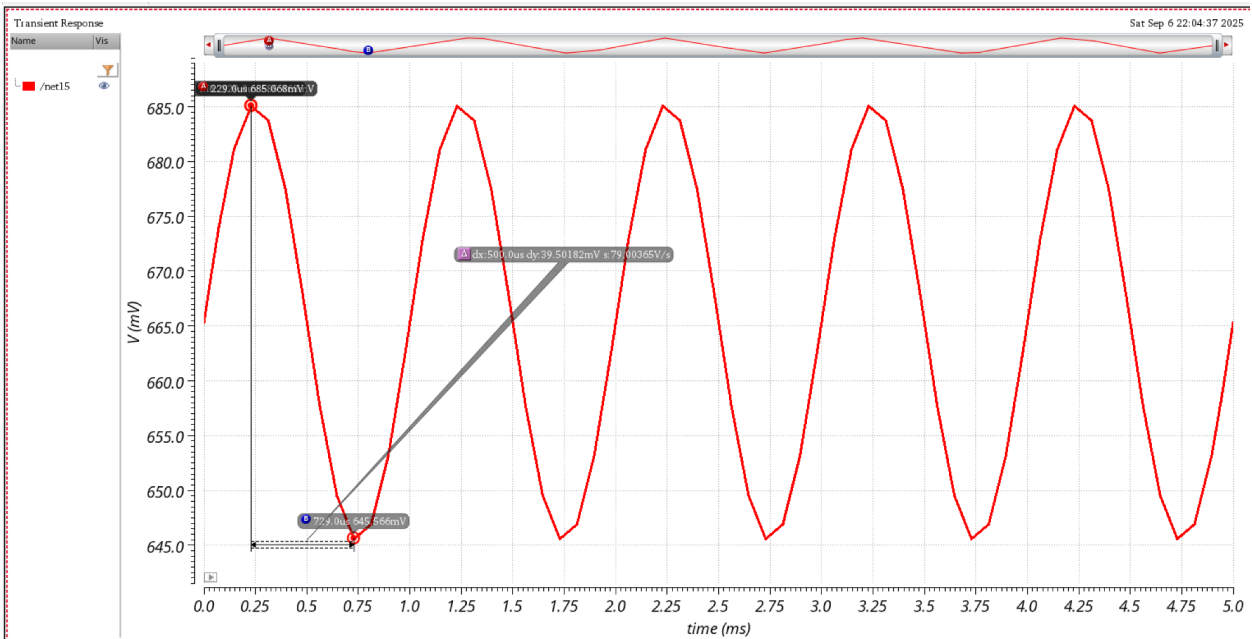
Plot after simulation: Auto Plotting mode: Replace

> Results in /home/prem/simulation/CD/spectre

9(53) Netlist and Run Status: Ready T=27 C Simulator: spectre State: ac_analysis

AC magnitude

20m V



39.501
40

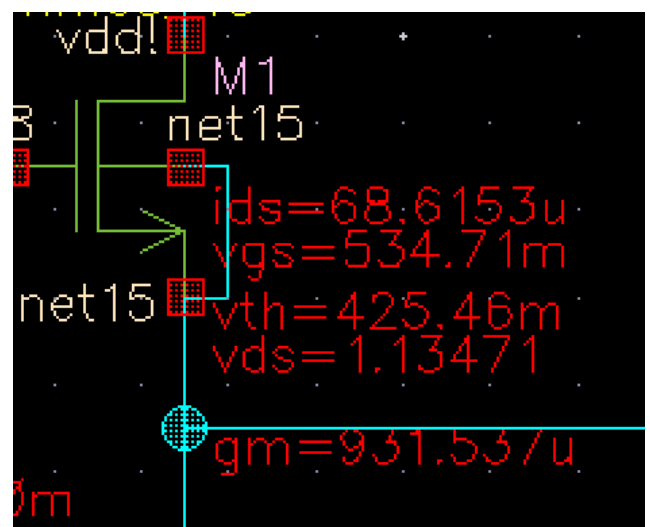
0.987 525

Gain = $39.501/40 = 0.987 > 0.95V/V$

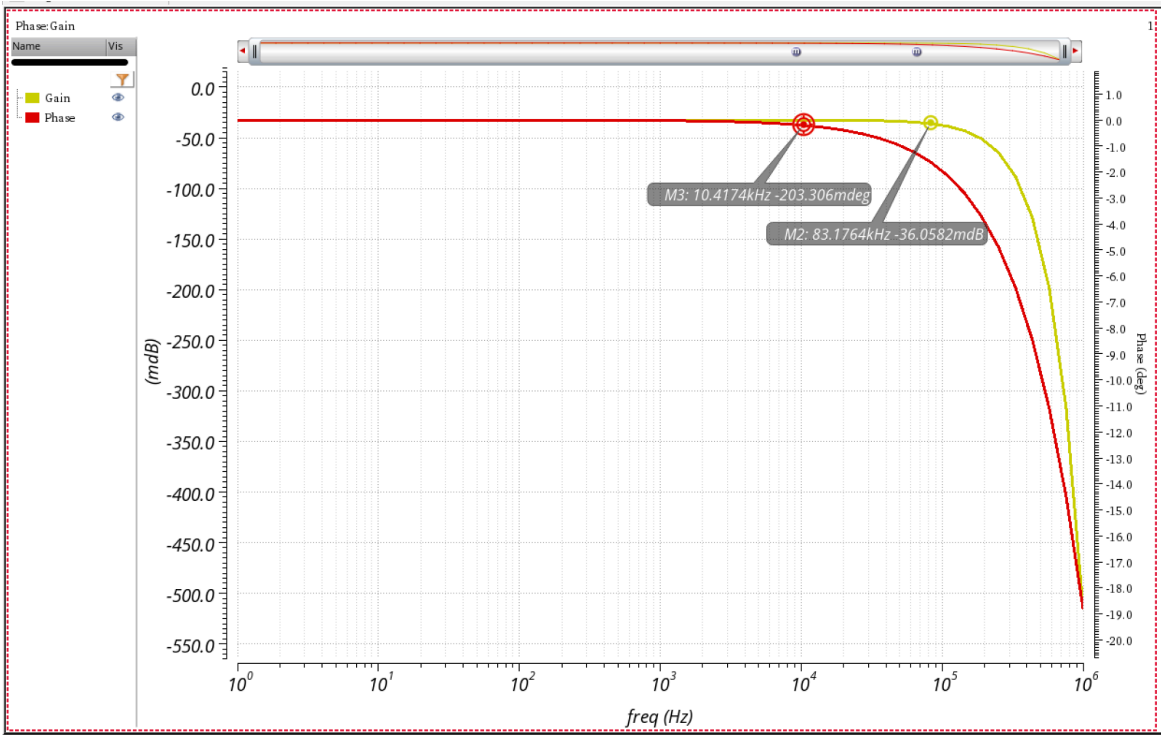
Power consumption

$(1 \times 10^{-6} + 68.6 \times 10^{-6})(1.8)$
0.000 125 28

~ Which is less than 2mW



Gain and phase plot:



Freq response

