

# EE 230 Experiment - 10

## Opamp based Sinusoidal Oscillators and Astable Multivibrator

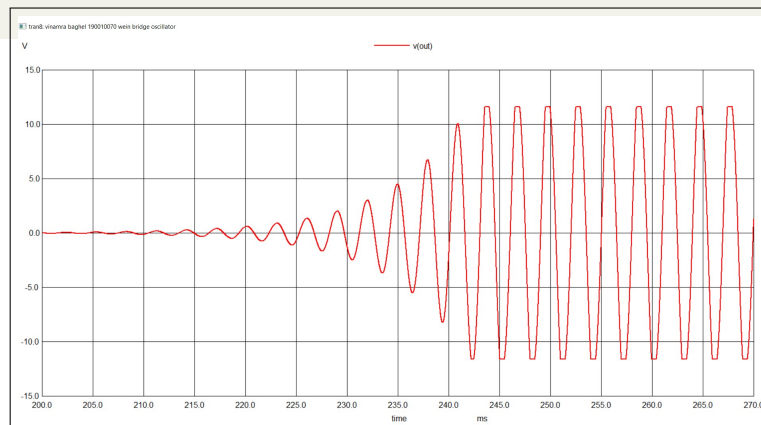
22th October, 2021

Vinamra Baghel

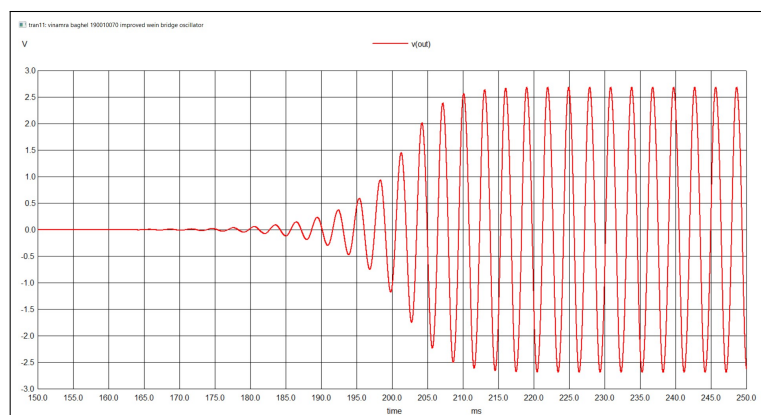
190010070

### 1 Wien-bridge oscillator

```
1 Vinamra Baghel 190010070 Improved Wein Bridge Oscillator
2 .include IN914.txt
3 .include ua741.txt
4 *Netlist
5 r1 gnd neg 4.7k
6 r2a neg 2 6.8k
7 r2b 2 out 3.3k
8 rs out 1 4.7k
9 cs 1 pos 0.1u
10 rp pos gnd 4.7k
11 cp pos gnd 0.1u
12 D1 2 out 1N914
13 D2 out 2 1N914
14 X1 pos neg pp np out ua741
15 Vccp pp gnd 12
16 Vccn np gnd -12
17 *Analysis
18 .tran 3u 250m 150m
19 .control
20 run
21 plot v(out)
22 .endc
23 .end
```



Wien-bridge oscillator



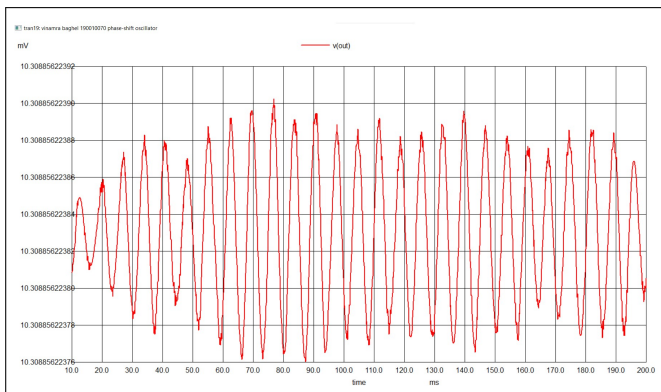
Wien-bridge oscillator with correction diodes

## 2 Phase-shift oscillator

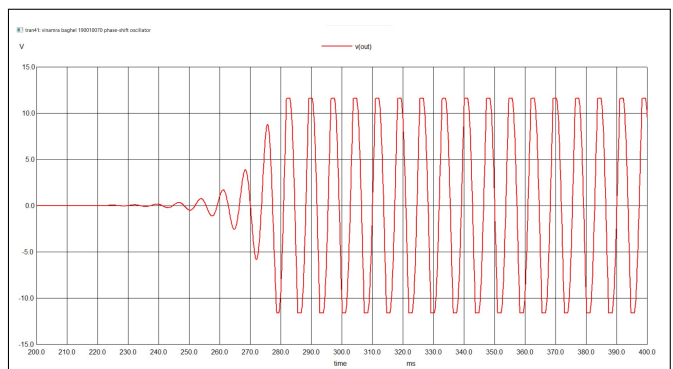
```

1 Vinamra Baghel 190010070 Phase-shift oscillator
2 .include IN914.txt
3 .include ua741.txt
4 *Netlist
5 rfa neg 1 47k
6 rfb 1 out 82k
7 r1 2 neg 4.7k
8 c1 2 3 0.1u
9 r2 3 gnd 4.7k
10 c2 3 4 0.1u
11 r3 4 gnd 4.7k
12 c3 4 out 0.1u
13 *D1 1 out 1N914
14 *D2 out 1 1N914
15 X1 gnd neg pp np out ua741
16 Vccp pp gnd 12
17 Vccn np gnd -12
18 *Analysis
19 .tran 100u 400m 200m
20 .control
21 run
22 plot v(out)
23 .endc
24 .end

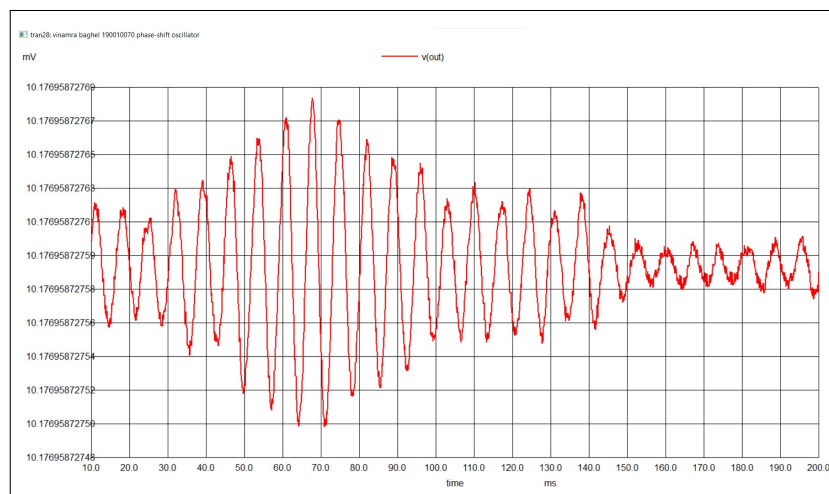
```



(a) Phase-shift oscillator



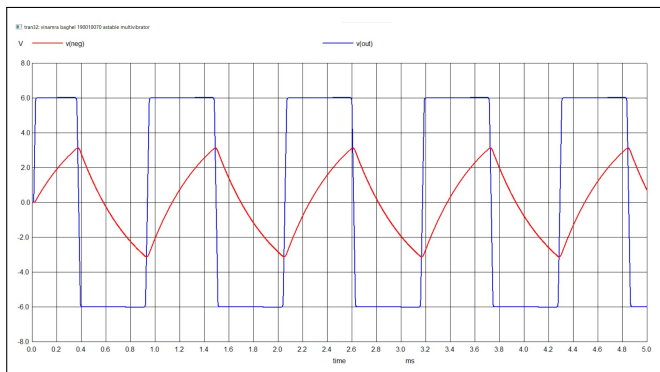
(b) Phase-shift oscillator with R short



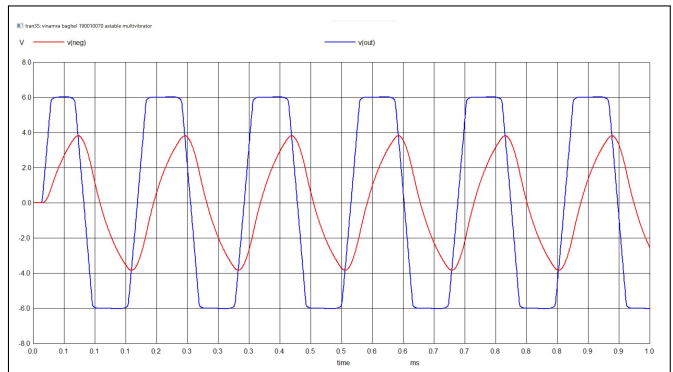
Phase-shift oscillator with correction diodes

### 3 Astable multivibrator

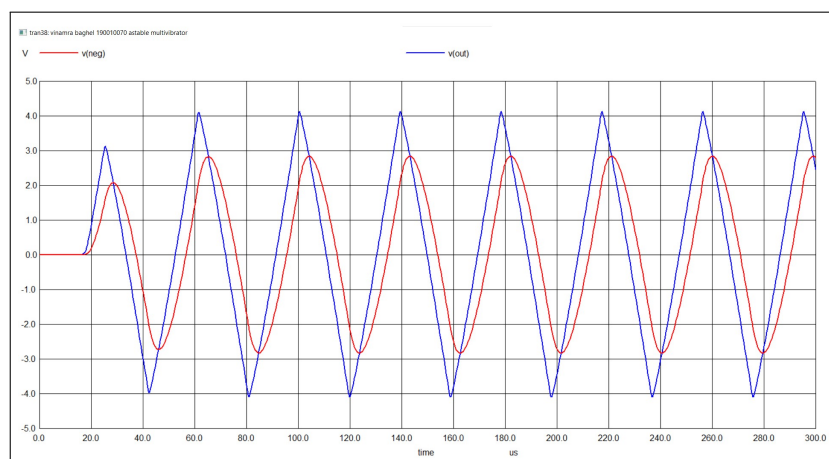
```
1 Vinamra Baghel 190010070 Astable multivibrator
2 .include zener_B.txt
3 .include ua741.txt
4 *Netlist
5 r neg out 4.7k
6 r1 out ref 10k
7 r2 ref gnd 10k
8 r3 opout out 1k
9 c gnd neg 0.001u
10 X2 out 1 DI_1N4734A
11 X3 gnd 1 DI_1N4734A
12 X1 ref neg pp np opout ua741
13 Vccp pp gnd 12
14 Vccn np gnd -12
15 *Analysis
16 .tran 0.5u 0.3m
17 .control
18 run
19 plot v(neg) v(out)
20 .endc
21 .end
```



(a)  $R = 4.7 \text{ k}\Omega$ ,  $C = 0.1 \text{ }\mu\text{F}$



(b)  $R = 4.7 \text{ k}\Omega$ ,  $C = 0.01 \text{ }\mu\text{F}$



$R = 4.7 \text{ k}\Omega$ ,  $C = 0.001 \text{ }\mu\text{F}$