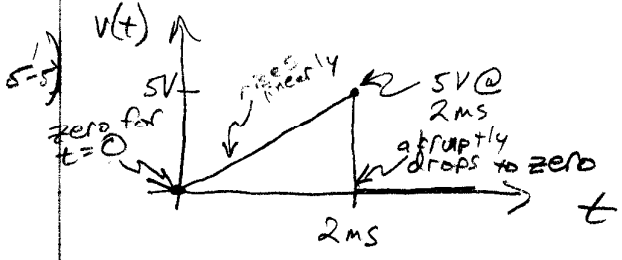
ENGR 210
F'03 HW# 8

SOLUTIONS

5-5)



for $t < 2ms$, like ramp: $A\,r(t)$

$5V = A \cdot .002s$

$A = 2500 \frac{V}{s}$

"turned off" after $t = 2ms$, like reflected unit step

$u(-(t - T_s))$

$T_s = .002s$

product of the two:

$v(t) = 2500 \frac{V}{s}\, r(t)\, u(.002s - t)$

(other forms possible)

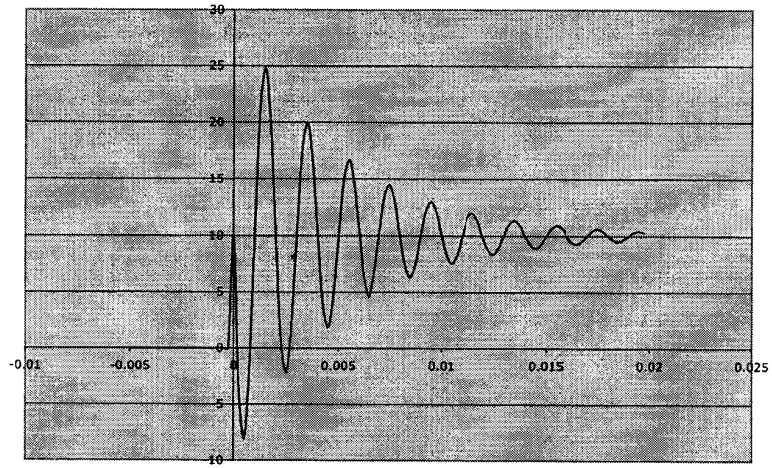
2 5-11) for $a\cos\left(\frac{2\pi}{T_0}t\right) + b\sin\left(\frac{2\pi}{T_0}t\right)$

period: T_0 frequency: $\frac{1}{T_0} = f_0$ amplitude: $\sqrt{a^2+b^2} = V_A$

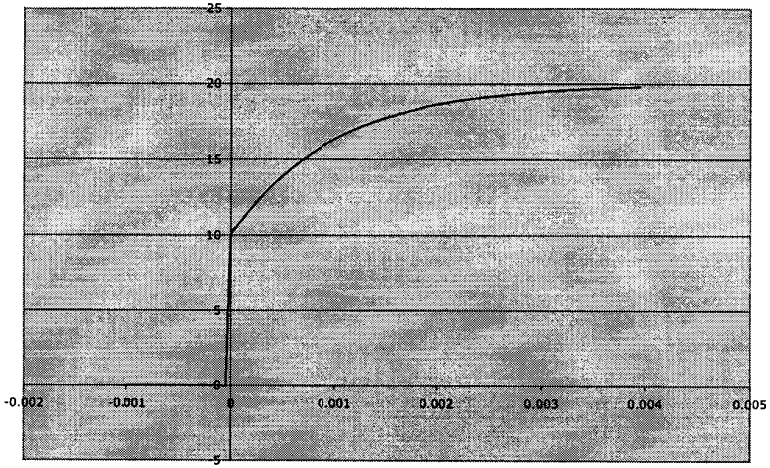
phase angle: $\tan^{-1}\left(-\frac{b}{a}\right) = \phi$ time sift: $-\frac{\phi T_0}{2\pi} = T_s$

	T_0	f_0	V_A	T_s	ϕ
a)	.001 s	1000 Hz	14.1 V	125 μs	$-\frac{\pi}{4}$
b)	.001 s	1000 Hz	36.1 V	93.6 μs	-.588
c)	10 s	.1 Hz	14.1 V	-1.25 s	$\frac{\pi}{4}$
d)	2.5 ms	400 Hz	36.1 V	859 μs	-2.16 ← NOT .982!

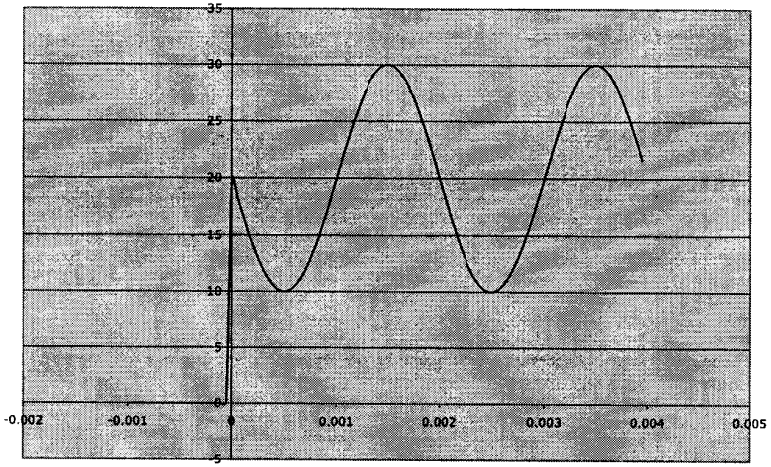
a


30
25
20
15
10
5
0
-5
-10
-0.01
-0.005
0
0.005
0.01
0.015
0.02
0.025

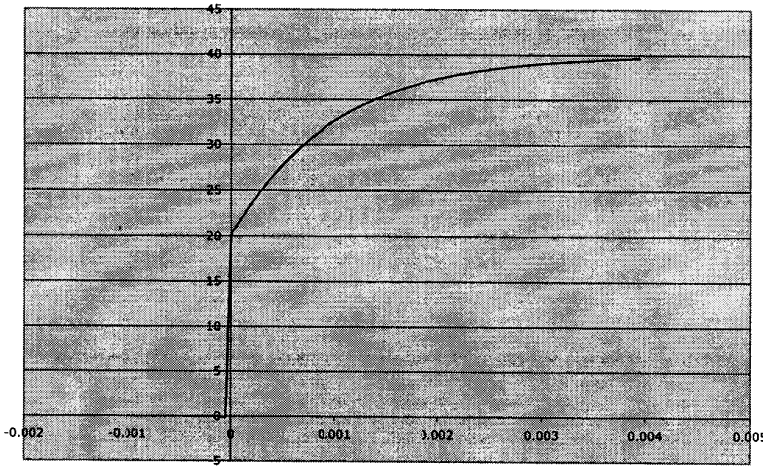
b


25
20
15
10
5
0
-5
-0.002
-0.001
0
0.001
0.002
0.003
0.004
0.005

c


35
30
25
20
15
10
5
0
-5
-0.002
-0.001
0
0.001
0.002
0.003
0.004
0.005

d


45
40
35
30
25
20
15
10
5
0
-5
-0.002
-0.001
0
0.001
0.002
0.003
0.004
0.005

4) 5-32) all are infinite sinusoids, so:

$V_p = V_A \quad V_{PP} = 2V_A \quad V_{rms} = \frac{1}{\sqrt{2}} V_A \quad V_{AVG} = 0$

	V_P	V_{PP}	V_{rms}	V_{AVG}
a)	14.1 V	28.3V	10V	0
b)	36.1V	72.1V	25.5V	0
c)	14.1V	28.3V	10 V	0
d)	36.1V	72.1V	25.5V	0

5-45

like Saw tooth wave