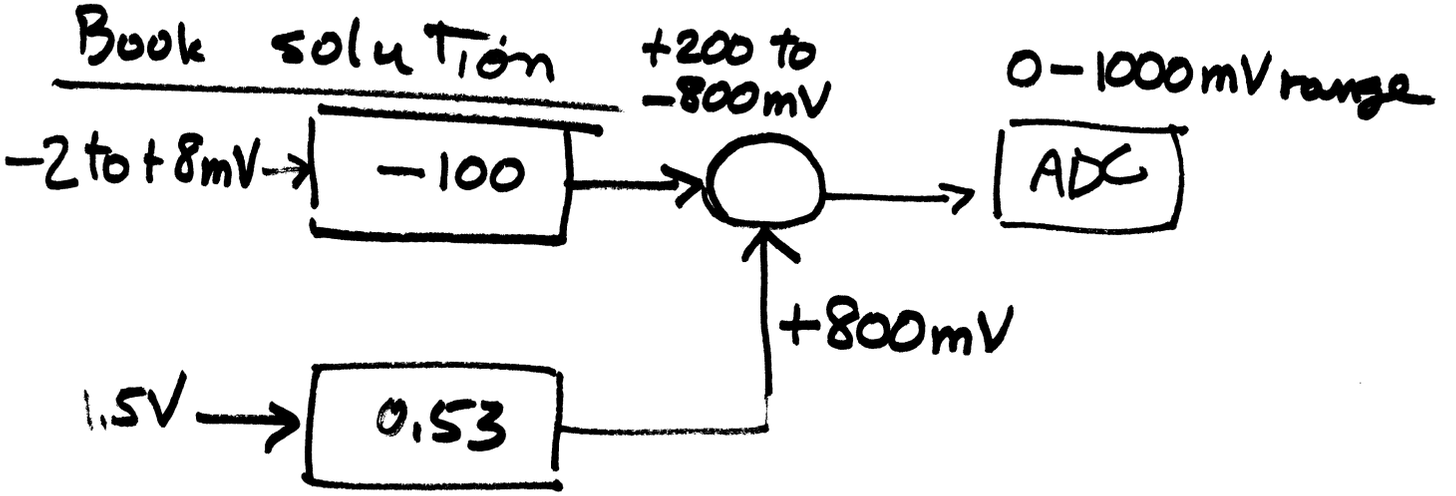
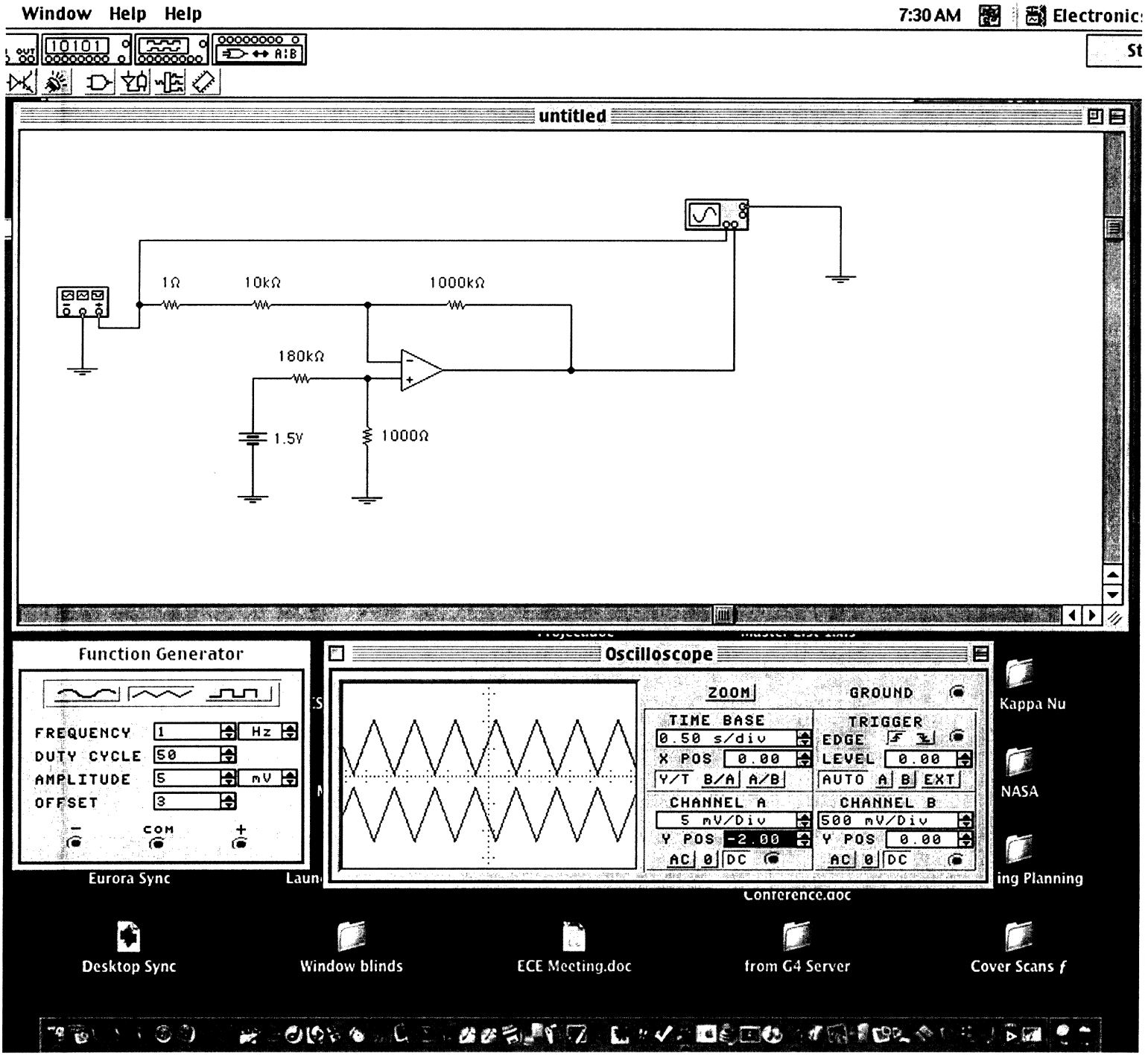
Book solution

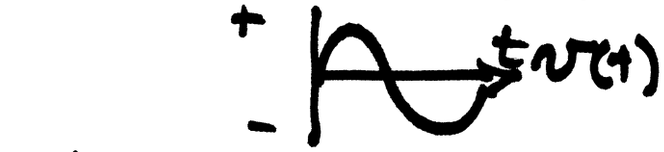



Window Help Help
7:30 AM
Electronic
untitled
1Ω
10kΩ
1000kΩ
180kΩ
1.5V
1000Ω
Function Generator
FREQUENCY 1 Hz
DUTY CYCLE 50
AMPLITUDE 5 mV
OFFSET 3
COM
Oscilloscope
ZOOM
GROUND
TIME BASE
0.50 s/div
X POS 0.00
Y/T B/A A/B
TRIGGER
EDGE
LEVEL 0.00
AUTO A B EXT
CHANNEL A
5 mV/Div
Y POS -2.00
AC 0 DC
CHANNEL B
500 mV/Div
Y POS 0.00
AC 0 DC
Kappa Nu
NASA
ing Planning
Eurora Sync
Conference.doc
Desktop Sync
Window blinds
ECE Meeting.doc
from G4 Server
Cover Scans f

Chapter 5

time varying signals

- exponential
- sinusoidal

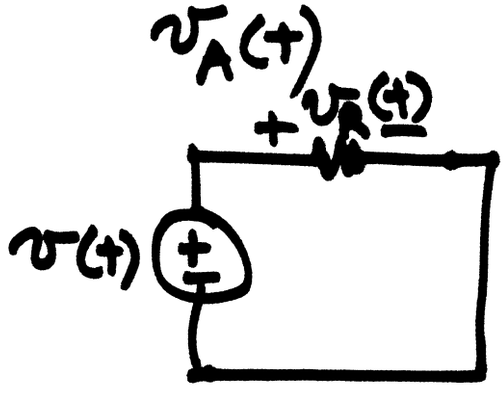


notation

V_o dc quantity

V_{BB}

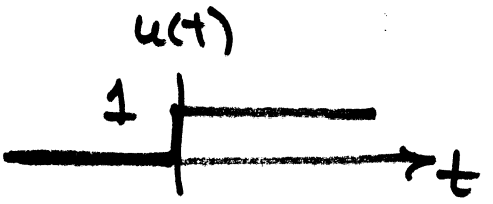
v_A ac quantity (time varying)



+, − marks define references

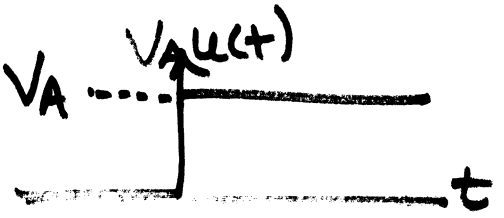
unit step function

$$u(t) = \begin{cases} 0 & t<0 \\ 1 & t \geq 0 \end{cases}$$



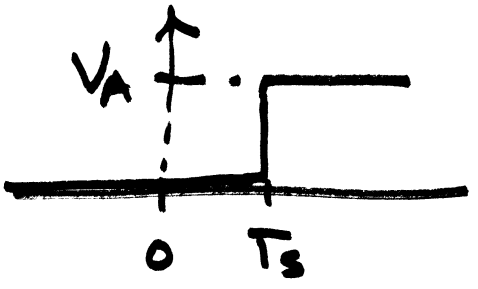
scale functions

$$V_A u(t) = \begin{cases} 0 & t<0 \\ V_A & t \geq 0 \end{cases}$$

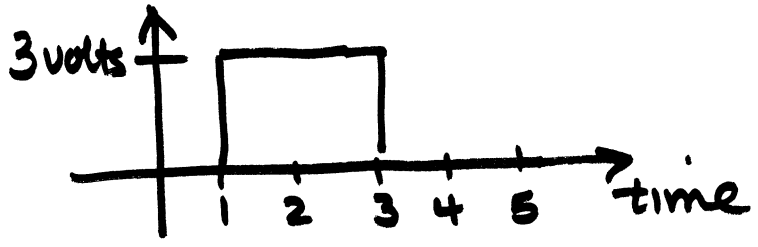


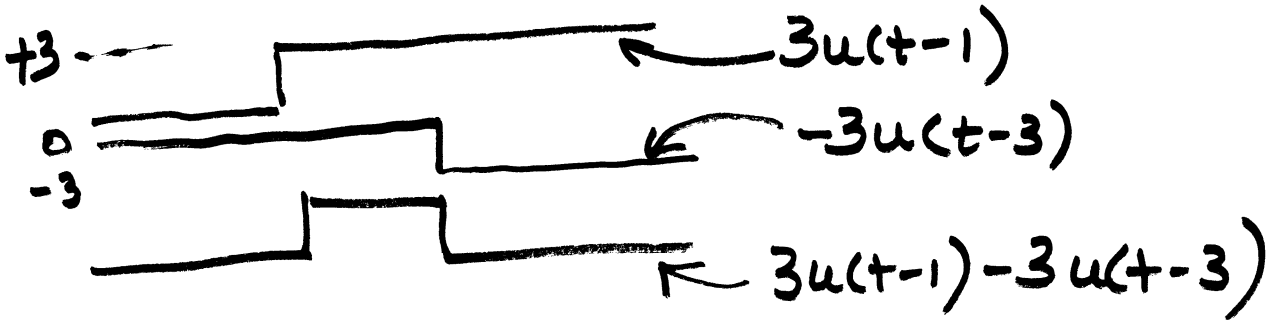
delay functions

$$V_A u(t-T_s) = \begin{cases} 0 & t<T_s \\ V_A & t \geq T_s \end{cases}$$



pulse waveform.

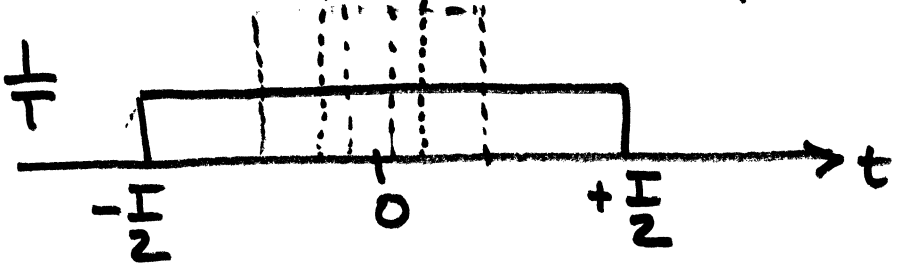




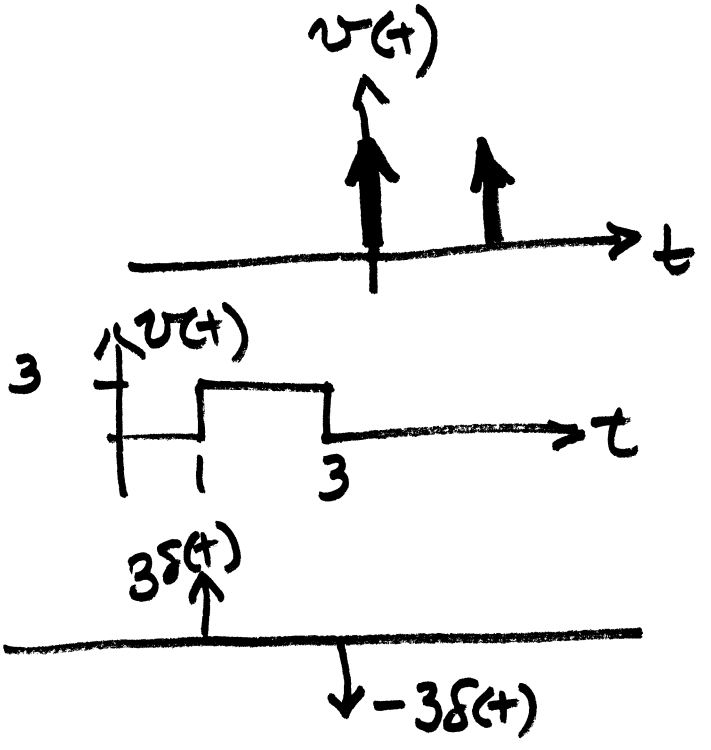
impulse function $\delta(t)$

pulse $v(t) = \frac{1}{T}\left[u(t+\frac{T}{2}) - u(t-\frac{T}{2})\right]$.

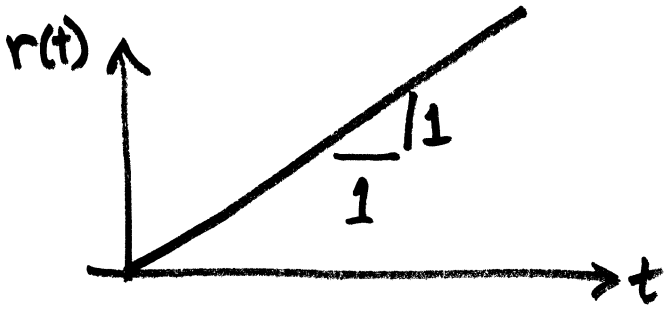
keep area constant



$$\lim_{T\to 0} \frac{u(t+\frac{T}{2}) - u(t-\frac{T}{2})}{T} = \frac{du(t)}{dt} = \delta(t)$$



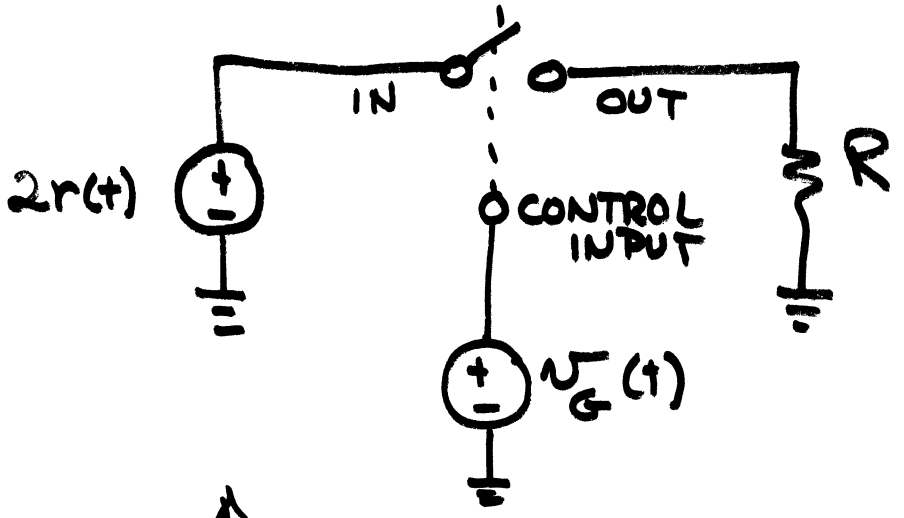
unit ramp

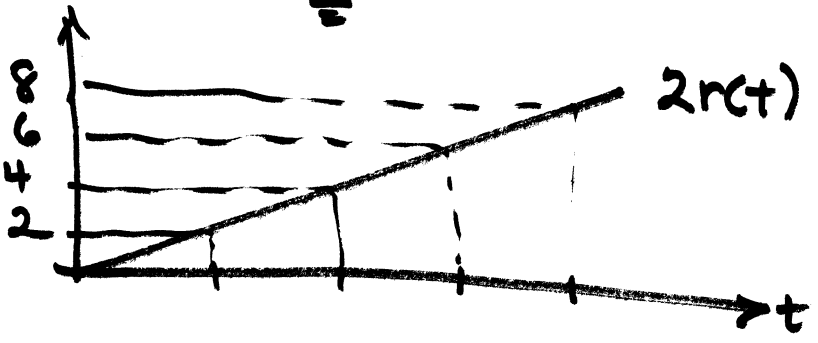


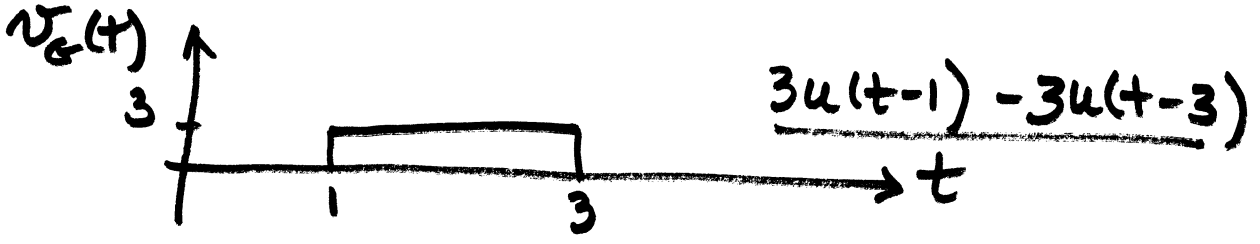
$$r(t) = \int_{-\infty}^{t} u(x)\,dx = t\,u(t)$$

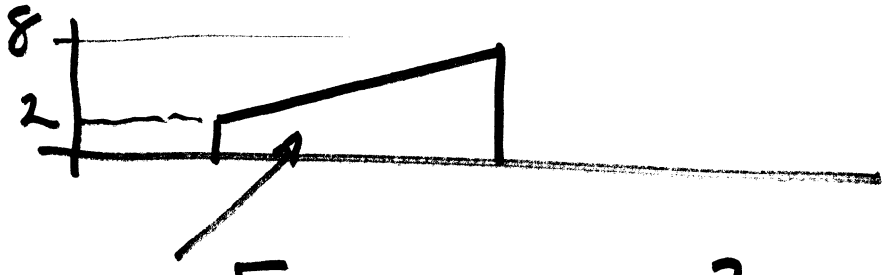
$$\frac{dr(t)}{dt} = u(t)$$

Example 5-3



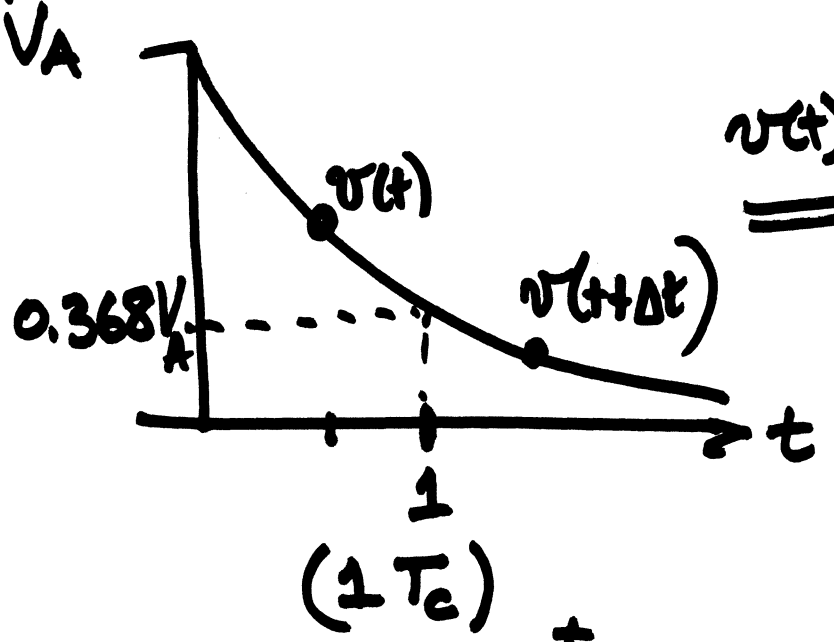






$$2r(t)\left[u(t-1)-u(t-3)\right]$$

Exponential waveform.



$$v(t) = V_A e^{-\frac{t}{T_c}}$$

at time t $\quad v(t) = V_A e^{-\frac{t}{T_c}}$

at time $t+\Delta t$

$$v(t+\Delta t) = V_A e^{-\frac{t+\Delta t}{T_c}} = V_A e^{-\frac{t}{T_c}} e^{-\frac{\Delta t}{T_c}}$$

$$\frac{v(t+\Delta t)}{v(t)} = \frac{V_A e^{-\frac{t}{T_c}} e^{-\frac{\Delta t}{T_c}}}{V_A e^{-\frac{t}{T_c}}} = e^{-\frac{\Delta t}{T_c}}$$