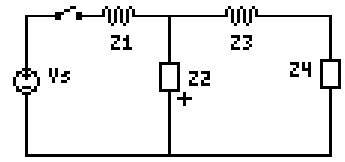
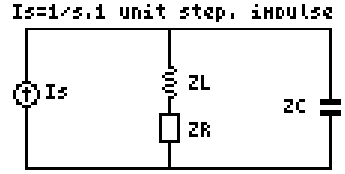
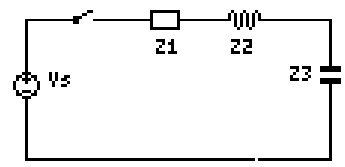
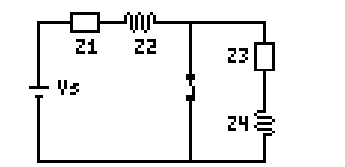
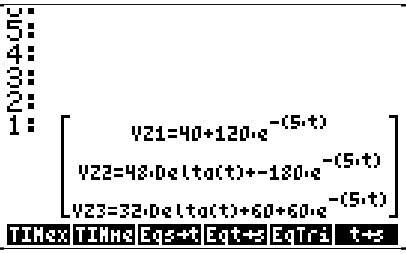
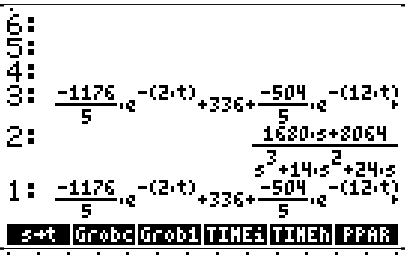
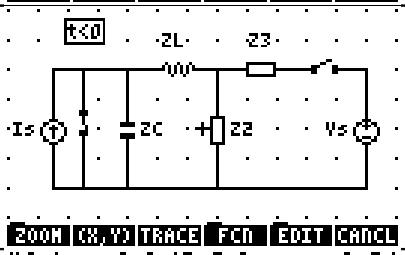
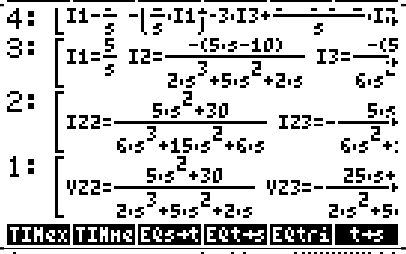
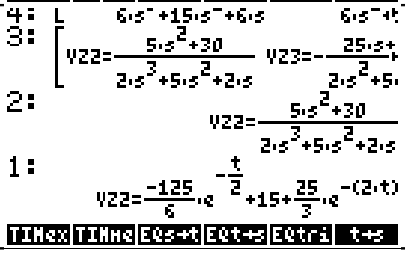
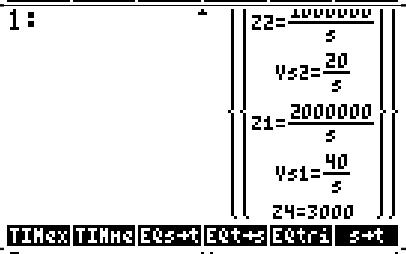
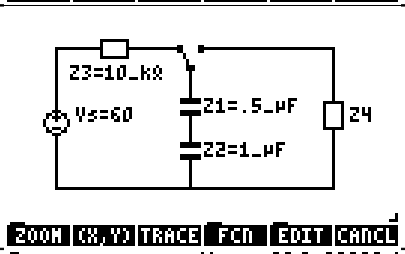
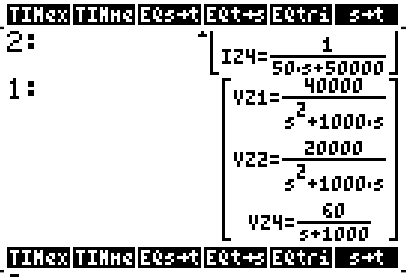
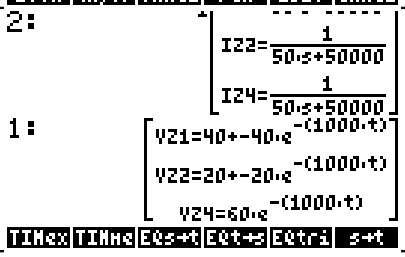
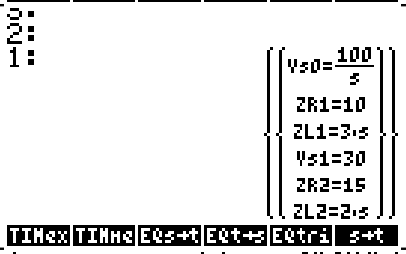
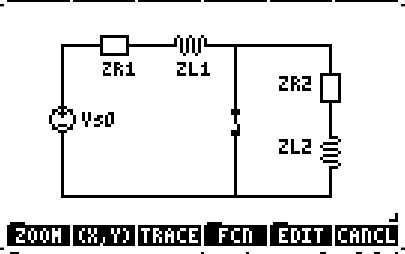
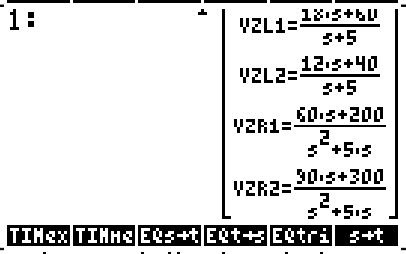
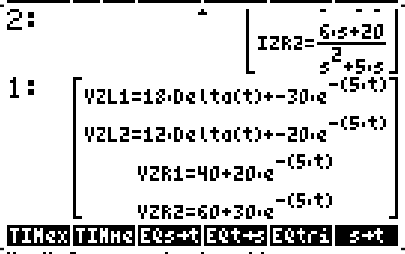
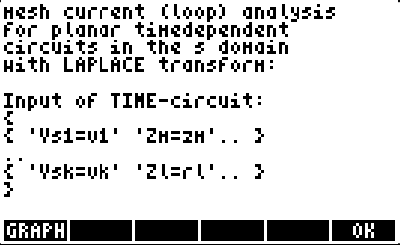
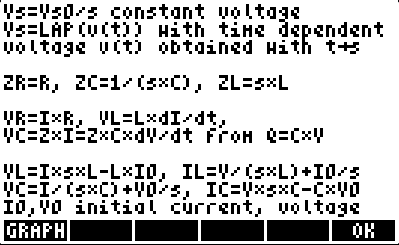
TIMECIRC

TIMex: examples for TIME circuits [OK] shows list	9: 8: 7: 6: 5: 4: 3: 2: 1: TIME circuit examples ex1: { { { 'Vs=336/s' ex2: { { { 'Is=1/s' '2 ex3: { { { 'Vs=32/s' ' ex4: { { { 'Is=sx.024/ ex5: { { { 'Vs1=50+100 ex6: { { { 'Is=5/s' '2 ex7: { { { 'Z2=1000000 ex8: { { { 'Vs0=100/s' CANCL OK	3: 2: 1: $\left\{\left\{Vs=\frac{336}{s}\right\}\left\{\begin{matrix}Z1=8.4\cdot s\\ Z2=42\end{matrix}\right\}\left\{\begin{matrix}Z2=42\\ Z3=10\cdot s\\ Z4=48\end{matrix}\right\}\right\}$ TIMex TIMmo EQs→t EQt→s EQtri s→t
Cursor left shows the corresponding graph of circuit TIMmesh: solves for currents and voltages in s domain (8s)	 (R,V) EDIT CANCL	2: $I24=\frac{1}{50\cdot s+50000}$ 1: $\left[\begin{matrix}VZ1=\frac{40000}{s^2+1000\cdot s}\\ VZ2=\frac{20000}{s^2+1000\cdot s}\\ VZ4=\frac{60}{s+1000}\end{matrix}\right]$ TIMex TIMmo EQs→t EQt→s EQtri t→s
EQs->t: transforms to time dependent quantities with inverse Laplace transform (1s) TIMex: next example	3: $\left[VZ3=\frac{1680}{s^2+14\cdot s+24}\ \ VZ4=\frac{8064}{s^3+14\cdot s^2+24\cdot s}\right]$ 2: $VZ4=\frac{8064}{s^3+14\cdot s^2+24\cdot s}$ 1: $VZ4=\frac{-2016}{5}\cdot e^{-(2\cdot t)}+336+\frac{336}{5}\cdot e^{-(1}$ TIMex TIMmo EQs→t EQt→s EQtri s→t	2: 1: $\left\{\left\{Is=\frac{1}{s}\right\}\left\{\begin{matrix}ZL=s\\ ZR=6\end{matrix}\right\}\left\{\begin{matrix}ZL=s\\ ZR=6\\ ZC=\frac{10}{s}\end{matrix}\right\}\right\}$ TIMex TIMmo EQs→t EQt→s EQtri s→t
Graph TIMmesh:(6s)	Is=1/s.1 unit step, impulse  ZOOM (R,V) TRACE FCN EDIT CANCL	2: $\left[VZC=\frac{10\cdot s+60}{s^3+6\cdot s^2+10\cdot s}\ \ VZL=\frac{10}{s^2+6\cdot s+10}\ \ VZR=\frac{60}{s^3+6\cdot s^2+10\cdot s}\right]$ 1: TIMex TIMmo EQs→t EQt→s EQtri s→t
EQs->t: (13s) EQtrig: trigonometric form(13s) Next example	2: $\left[\begin{matrix}VZC=-\left[(3-4\cdot i)\cdot e^{-((3-i)\cdot t)}\right]+6-(3\cdot\\ VZL=-\left(5\cdot i\cdot e^{-((3-i)\cdot t)}\right)+5\cdot i\cdot\\ VZR=-\left[(3-3\cdot i)\cdot e^{-((3-i)\cdot t)}\right]+6-(3\cdot\end{matrix}\right.$ 1: $\left[\begin{matrix}VZC=6-(8\cdot SIN(t)+6\cdot COS(t))\cdot e^{-(3\cdot}\\ VZL=10\cdot SIN(t)\cdot e^{-(3\cdot t)}\\ VZR=6-(18\cdot SIN(t)+6\cdot COS(t))\cdot e^{-(3}\end{matrix}\right]$ TIMex TIMmo EQs→t EQt→s EQtri s→t	4: 3: 2: 1: $\left\{\left\{Vs=\frac{32}{s}\right\}\left\{\begin{matrix}Z1=.96\\ Z2=.8\cdot s\\ Z3=\frac{1}{1.25\cdot s}\end{matrix}\right\}\right\}$ TIMex TIMmo EQs→t EQt→s EQtri t→s
Graph TIMmesh:(5s)	 ZOOM (R,V) TRACE FCN EDIT CANCL	2: 1: $\left[\begin{matrix}VZ1=\frac{132}{5\cdot s^2+6\cdot s+5}\\ VZ2=\frac{160\cdot s}{5\cdot s^2+6\cdot s+5}\\ VZ3=\frac{160}{5\cdot s^3+6\cdot s^2+5\cdot s}\end{matrix}\right]$ TIMex TIMmo EQs→t EQt→s EQtri t→s
EQs-t:(6s) EQtrig:(8s) TIMex: example with δ and constant voltage source	5: 4: 3: $VZ3=\frac{160}{5\cdot s^3+6\cdot s^2+5\cdot s}$ 2: $VZ3=-\left[(16-12\cdot i)\cdot e^{-\frac{(3-4\cdot i)\cdot t}{5}}\right]+32-$ 1: $VZ3=-24\cdot e^{-\frac{3\cdot t}{5}}\cdot SIN\left(\frac{4\cdot t}{5}\right)+-32\cdot e^{-\frac{3\cdot}{}}$ TIMex TIMmo EQs→t EQt→s EQtri s→t	4: 3: 2: 1: $\left\{\left\{Vs1=50+\frac{100}{s}\right\}\left\{\begin{matrix}Z1=10\\ Z2=3\cdot s\\ Vs2=30\\ Z3=15+2\cdot s\end{matrix}\right\}\right\}$ TIMex TIMmo EQs→t EQt→s EQtri t→s
graph of circuit before t=0 TIMmesh:(5s)	 (R,V) EDIT CANCL	2: 1: $\left[\begin{matrix}VZ1=\frac{160\cdot s+200}{s^2+5\cdot s}\\ VZ2=\frac{48\cdot s+60}{s+5}\\ VZ3=\frac{32\cdot s^2+220\cdot s+300}{s^2+5\cdot s}\end{matrix}\right]$ TIMex TIMmo EQs→t EQt→s EQtri t→s

EQs->t: time dependent voltages (6s) t->s: Laplace transform (2.3s) s->t: inverse Lapl.trf. (3.3s)		
TIMex: graph of circuit before t=0		
TIMmesh:(12s) EQs->t:		
TIMex: graph of circuit before t=0		
TIMmesh:(5s) EQs->t:(4s)		
Example Graph		
TIMmesh:(6s) EQs->t:(7s)		
TIMinfo: info on time dependent circuits		

TIMinfo:

TIMhelp: help

```
At first you have to calculate
the circuit for t<0 giving you
ev. initial currents and
voltages. Then consider the
circuit for t>0. If there are
initial currents or voltages
you have to add sources
to conductors or capacitors
in the mesh. See ex2 in TIMex.

Loop currents are named I1,I2..
in the order of the lists,
GRAPH                      OK
```

```
TIMECIRC time dependent circuits
with LAPLACE transform
details see TIMEinfo

TIMex     _ → {} examples for
          TIMmesh in s domain.
          Press cursor left to see
          a graphic for t<0.
TIMmesh {} → {} [eqn] [Ik=..]
          [I2k=..] [V2k=..]
          solves for I2k,V2k in
          s domain.
GRAPH                      OK
```

TIMhelp:

```
Eqs→t    [Vk=vk(s)]→ [][Vk=vk(t)]
         inverse laplacetransform
         to time dependent eqns
Eqt→s    [Vk=vk(t)]→ [][Vk=vk(s)]
         laplacetransform to
         s dependent eqns
EqTrig   [Vk=vk(t)] → []'
         eqn → trigonometric form
t→s      F(t) → F(s) LAPLACE
         transform
s→t      F(s) → F(t) inverse
         LAPLACE transform
GRAPH                      OK
```

```
s→t      F(s) → F(t) inverse
         LAPLACE transform
Pltex    _ → 'Y=Y(t)' examples
         for Plott in choose-box
Plott    'Y=Y(t)' plot function
         of t, Y-RANGE determined
         by AUTO, specify X-RANGE
         with [LS]&[F2]=MIN
TC(M)Grob  _ → grob,
         choose (mini) grob
TIMEinfo _ → _ info on time
         dependent circuits
GRAPH                      OK
```