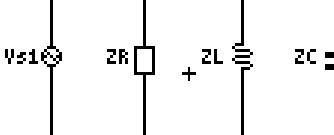
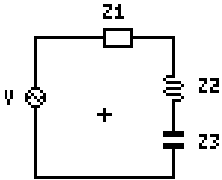
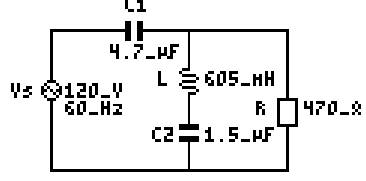
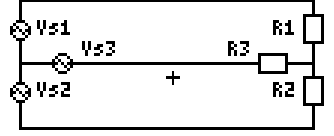


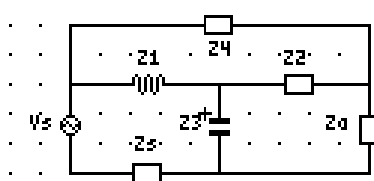
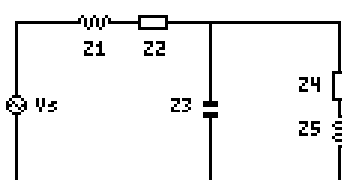
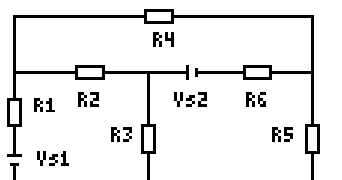


# ACCIRC

ACex: examples for AC circuits	<pre> 1: AC circuit examples ex1: { { { 'Vs1=120' ' ex2: { { { 'Vs1=v1' '2 ex3: { { { 'Vs=120.' ' ex4: { { { 'Vs=170' '2 ex5: { { { 'Vs=170' '2 ex6: { { { 'Vs1=120' ' ex7: { { { 'Vs1=120' ' </pre> <p>[OK] shows list</p>	<pre> 1: {   {Vs1=120}   {ZK=250.}   {ZL=1.245.04422698}   {ZC=-1.1768.38825658}   {ZL=1.245.04422698}   {ZC=-1.1768.38825658} } ACex ACmes EQxPol RXPOL IMPEX ZINPS </pre>
Cursor left shows the corresponding graph of circuit	 <p>200H (X,Y) TRACE Fcn EDIT CANCEL</p>	<pre> 3: I1=(.48,-.421849115888) 2: I2=(0.,-.421849115888) 1: I3=(0.,6.78584013174E-2) I2C=(0.,6.78584013174E-2) I2L=(0.,-.489707517205) I2R=(.48,0.) V2C=(120.,0.) V2L=(120.,0.) V2R=(120.,0.) ACex ACmes EQxPol RXPOL IMPEX ZINPS </pre>
ACmesh: solves for currents and voltages in circuit (5s)		
an symbolic example	<pre> 5: { 4: { 3: { 2: { 1: {   {Vs1=v1}   {Z1=R}   {Z2=i.*wL}   {Z3=1/(i.*wC)} } } } } } ACex ACmes EQxPol RXPOL IMPEX ZINPS </pre>	 <p>200H (X,Y) TRACE Fcn EDIT CANCEL</p>
graph of circuit		
ACmesh: solutions (10s)	<pre> 2: L = (i.*w^2.L+w.R).C-i 1: V21= (i.*w^2.L+w.R).C-i V22= i.*w^2.L.C.v1 V23= -v1 V24= (i.*w^2.L+w.R).C-i ACex ACmes EQxPol RXPOL IMPEX ZINPS </pre>	<pre> 3: Vs=120. 2: { 1: {   {ZC1=-564.379230824i}   {ZL=245.04422698i}   {ZC2=-1768.38825658i}   {ZC2=-1768.38825658i}   {ZL=245.04422698i}   {ZK=470.} } } ACex ACmes EQxPol RXPOL IMPEX ZINPS </pre>
example 3		
graph of circuit	 <p>(X,Y) EDIT CANCEL</p>	<pre> 3: LI2=(.105389599562,9.23413000E-2) 2: I2C1=(7.68993766167E-2,.12 I2C2=(-2.84902229453E-2,3.25 I2L=(-2.84902229453E-2,3.251 I2R=(.105389599562,9.23413 V2C1=(70.4668882065,-43.4004 V2C2=(57.5009791004,50.3817 V2L=(-7.96786730618,-6.98136 V2R=(49.5331117941,43.40041 ACex ACmes EQxPol RXPOL IMPEX ZINPS </pre>
ACmesh: solutions (4.3s)		
EQxPol: equation to polar form and back (0.6s)	<pre> 3: I21=(0.076899,0.124857) 2: I22=(-0.028490,0.032516) I23=(-0.028490,0.032516) I24=(0.105389,0.092341) 1: 'I21'="(0.146638,4658.37116) 'I22'="(0.043232,46131.22457 'I23'="(0.043232,46131.22457 'I24'="(0.140121,4641.22457 ACex ACmes EQxPol RXPOL IMPEX ZINPS </pre>	<pre> 1: {   {Z1=1.44}   {Z2=1.44}   {Vs3=60+i.60.*sqrt(3)}   {Vs2=60-i.60.*sqrt(3)}   {Vs3=-60-i.60.*sqrt(3)}   {Z3=1.44}   {Z2=1.44} } ACex ACmes EQxPol RXPOL IMPEX ZINPS </pre>
ACex: 3-phase example		
cursor left shows circuit	 <p>200H (X,Y) TRACE Fcn EDIT CANCEL</p>	<pre> 4: I1=83.3333333333 3: I2=(41.6666666667,-72.168783 I21=83.3333333333 I22=(41.6666666667,-72.168783 I23=(41.6666666667,72.168783 V21=120. V22=(60.,-103.923048454) V23=(59.9999999999,103.92304 ACex ACmes EQxPol RXPOL IMPEX ZINPS </pre>
ACmesh: calculate circuit (3.5s)		

Another 3-phase example		
graph	<pre>4 { 'Vs1=120' 'Z1=1.44' } { 'Vs2=120*EXP(i*2*pi/3)' 'Z2=1.44' } { 'Vs3=120*EXP(i*4*pi/3)' 'Z3=1.44' } +SKIP SKIP+ +DEL DEL+ DEL L INS =</pre>	
ACmesh solutions(5s)	<pre>3: I1=83.3333333333 I2=(-41.6666666667,72.16872) I3=(-41.6666666667,-72.16872) 2: I21=83.3333333333 I22=(-41.6666666667,72.16872) I23=(-41.6666666667,-72.16872) 1: V21=120. V22=(-59.9999999995,103.923) V23=(-59.9999999995,-103.923) ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>	<pre>{ { 'Vs=170' 'Z1=i*6' 'Z3=-7*i' 'Zs=0' } { 'Z2=-7*i' 'Z2=10' 'Zs=0' } { 'Z4=24' 'Z2=10' 'Z1=i*6' } }</pre> <pre>+SKIP SKIP+ +DEL DEL+ DEL L INS =</pre>
ACex: exmple		
Graph of circuit		<pre>2: I2a=(13.467453505,-26.81336) 1: I2s=(51.7721745351,-17.69313) V21=(106.158798283,268.1330) V22=(63.8412017167,-268.1330) V23=(63.8412017166,-268.1330) V24=170. V2a=(0.,0.) V2s=(0.,0.) ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>
ACmesh solutions(8s)		
ImpEx: examples for impedance calculation	<pre>9: choose example 8: ex1: { { 250_0 650_mH 7: ex2: { { R L C } F } 6: ex3: { { R1 L2 C3 C4 } 5: ex4: { { 'R1=100_0' 'L 4: ex5: { { 'R1=100_0' 'L 3: ex6: { { { 'Vs=120_V' 2: 1: +SKIP SKIP+ +DEL DEL+ DEL L INS =</pre>	<pre>3: { 250_0 650_mH 1.5_uF 60 2: 1: { 250. i*245.04422698 -(i*1768.38825658) ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>
[OK] example with frequency ->Imped: calculates impedance (0.8s)		
symbolic examples	<pre>4: { R 3: { L { C 2: { f 1: { R { i*2*pi*f*L { 1 { i*2*pi*f*C ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>	<pre>4: { R1 3: { L2 { C3 2: { w 1: { R1 { i*w*L2 { 1 { i*w*C3 ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>
example with $\omega$		
->Imped: calculate impedances (2s)	<pre>5: { R1=100_0 4: { L=10_mH 3: { R2=50_0 2: { C=10_uF 1: w=10000_1/s ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>	<pre>6: { ZR1=100. 5: { ZL=100.i 4: { ZR2=50. 3: { ZC=-10.i 2: 1: ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>
example with f		
->Imped: calculate impedances (2s)	<pre>6: { R1=100_0 5: { L=10_mH 4: { R2=50_0 3: { C=10_uF 2: 1: f=1591.54943092 ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>	<pre>6: { ZR1=100. 5: { ZL=100.i 4: { ZR2=50. 3: { ZC=-10.i 2: 1: ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>
example with circuit (see example 3 above)		
->Imped: calculate impedances (3.7s)	<pre>2: { { Vs=120_V { C1=4.7_uF { L=650_mH { C2=1.5_uF { C2=1.5_uF { L=650_mH { R=.47_k0 1: f=60_Hz ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>	<pre>2: { { Vs=120. { ZC1=-564.379230824.i { ZL=245.04422698.i { ZC2=-1768.38825658.i { ZC2=-1768.38825658.i { ZL=245.04422698.i { ZR=470. 1: ACex ACmes EQxPo RxFoL ImpEx +Imps</pre>

Zex: impedance examples RxPol: polar form (0.1s)		$\left\{ R + i\omega L \frac{1}{1 + i\omega C} \right\}$
Zser,Zpar: serial, parallel impedance (0.1s)	$\frac{250L}{2\pi \cdot 39000 \cdot (Hz \cdot \mu H)} \cdot \frac{1}{2\pi \cdot 90 \cdot (Hz \cdot \mu F)}$	$\left\{ \frac{R}{1 + i\omega L + \frac{1}{i\omega C}} \right\}$
Zpar: parallel impedance (0.1s)	$\frac{1}{\frac{1}{R} + \frac{1}{i\omega L} + i\omega C}$	$\frac{1}{\frac{1}{R} + \frac{1}{i\omega L} + i\omega C}$
Zcart: cartesian form (5s)	$\frac{1}{\frac{1}{R} + \frac{1}{i\omega L} + i\omega C}$	$-ATAN\left(\frac{\omega^2 \cdot R \cdot L \cdot C - R}{\omega L}\right)$
Zangle: angle	$\frac{1}{\frac{1}{R} + \frac{1}{i\omega L} + i\omega C}$	$\frac{1}{\frac{1}{R} + \frac{1}{i\omega L} + i\omega C}$
Powex: examples for power calculation		$P_c = \frac{V_m \cdot I_m \cdot \cos(\theta_I - \theta_V)}{2}$
Power: power calculation (7s)	$P_c = 750 + 750 \cdot i \cdot \sqrt{3}$	$P_c = \frac{V_m \cdot I_m \cdot \cos(\theta_I - \theta_V)}{2}$
Power: power calculation (7s)	$P_c = 750 + 750 \cdot i \cdot \sqrt{3}$	$P_c = \frac{V_m \cdot I_m \cdot \cos(\theta_I - \theta_V)}{2}$
Trfex: example transformer		$P_c = 750 + 750 \cdot i \cdot \sqrt{3}$
graph of circuit		$P_c = 750 + 750 \cdot i \cdot \sqrt{3}$
Trformer: calulate circuit (5s)		$P_c = 750 + 750 \cdot i \cdot \sqrt{3}$
ACgrob: choose graphic object (grob)		$P_c = 750 + 750 \cdot i \cdot \sqrt{3}$
OK gives object		$P_c = 750 + 750 \cdot i \cdot \sqrt{3}$
ACmgrob: mini graphic objects		$P_c = 750 + 750 \cdot i \cdot \sqrt{3}$
OK gives object		$P_c = 750 + 750 \cdot i \cdot \sqrt{3}$

circuits drawn with minigrobs	 SUB REFL PICT+ R,V+ PICT	 SUB REFL PICT+ R,V+ PICT
ACinfo: info on circuits	<p>Mesh current (loop) analysis For planar AC circuits:</p> <p>Input of AC-circuit:</p> <pre>{   'Vs1=v1' 'Z1=z1'... } {   'Vsk=vk' 'Zl=rl'... } }</pre> <p>The complex impedances must be named as Z1,Z2... ZR,ZL,ZC...</p> GRAPH	<p>ex: ZR=5, ZL=i*5, ZC=-i*6</p> <p>We recommend to start from the lower left corner and to proceed clockwise for every mesh. Then it should be easy to draw the circuit from the list of lists.</p> <p>Loop currents are named I1,I2... in the order of the lists, Complex impedances are Z1,Z2... voltage sources are Vs1,Vs2...</p> GRAPH
HelpAC: help	<p>AC alternate current</p> <p>ACex _ + {}...{} choosebox With examples for ACmesh. press cursor left to see a graphic of the circuit</p> <p>ACmesh {}...{} + {} IIRk=1 IIRk=..1 IIRk=..1 IIRk=..1 Mesh analysis for planar AC networks. In the lists use impedances ZR=R, ZL=i*XL, ZC=-i/(w*C)</p> GRAPH	<p>w=2*pi*f, f=Frequency details see ACinfo</p> <p>EQxPol ['I1=(1,2)']... + {I1:(2,2,263.4)}</p> <p>RxPol {(x,y)...} + {(r,d)}</p> <p>ImpEx {} + {} example for +Imped</p> <p>+Imped {} f,w + {} impedance from R, L, C and Frequency f,w You can enter the circuit</p> GRAPH
ACHelp:	<p>With Vs,R,L,C and +Imped calculates the list with impedances for ACmesh</p> <p>ex 6 in Impex gives ex 3 in ACex</p> <p>Zex _ + {} examples resistors</p> <p>Zser {} + 2 serial resistors</p> <p>Zpar {} + 2 parallel resistors</p> <p>Zpolar x+iy + r*exp(i*x)</p> <p>Zcart (x,y) + x+iy</p> <p>Zangle (x,y) + a (x,y)</p> <p>Zabs (x,y) + f(x^2+y^2) (x,y)</p> GRAPH	<p>Powex _ + {} example For Power</p> <p>Power {} + V*I=... Pc calculates time dependent and complex power from sin, cos voltage, current [LS] [EXPLO] [EXPAND] gives the SIN,COS part Pc=P+ixQ P=average, Q=reactive power P,Q=V0*I0/2*COS(SIN(θu-θi))</p> <p>Trfex _ + {} example Trformer press cursor left for</p> GRAPH
ACHelp:	<p>picture, ZH=i*XL, dK=1</p> <p>Trformer {} + {} [eqn] IIR1 [Zab PZab P1 w]</p> <p>calculate lin.transformer IIR=current, Zab=impedance at source, P=RE(Z)*IIR^2 power at Zab,Zl=load, w=P1/PZab</p> <p>Tr+T {} L1 L2 M3 + {} La Lb Lc</p> <p>Pi EQUIVALENT CIRCUIT</p> <p>Tr+T {} L1 L2 M3 + {} La Lb Lc</p> GRAPH	<p>T EQUIVALENT CIRCUIT</p> <p>Plwex _ + examples For Plotw</p> <p>Plotw a(w)+ib(w),a(f)+ib(f) + parametric plot</p> <p>AC(N)Grob _ + grob, choose (min)grob to plot circuit</p> <p>Grob1 var, string + grob size 1</p> <p>Parreset _ + _ reset to parameter plot</p> <p>CFlags _ + _ reset to flags for easy handling of</p> GRAPH