# Determine T1 two-port parameters

Assign symbolic or numeric values
to the circuit elements and determine
the T1 two-port parameters by hand
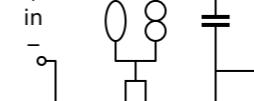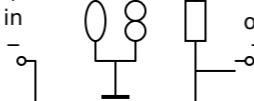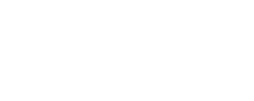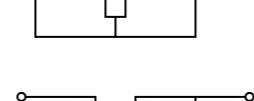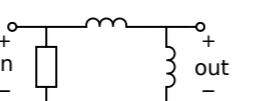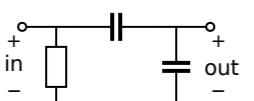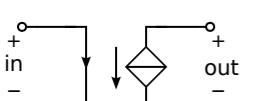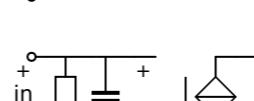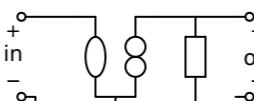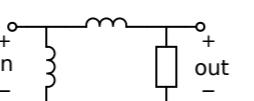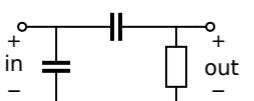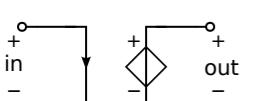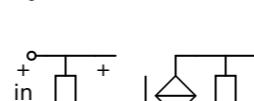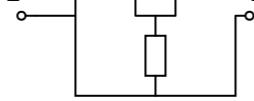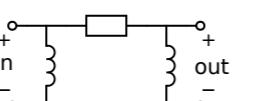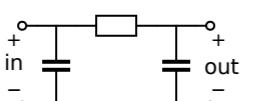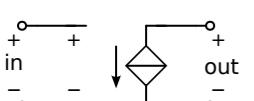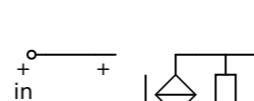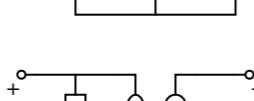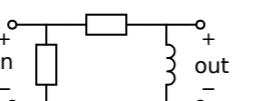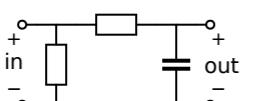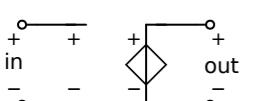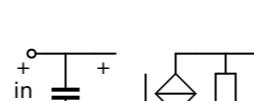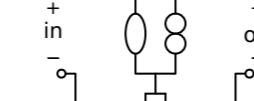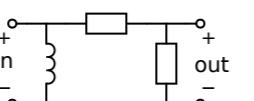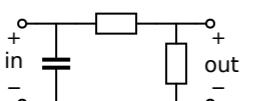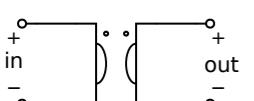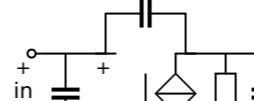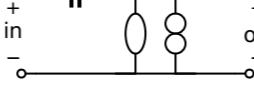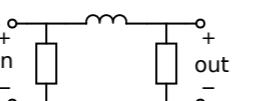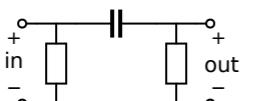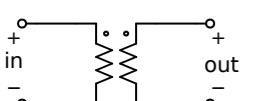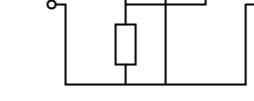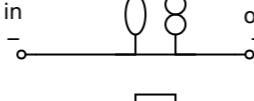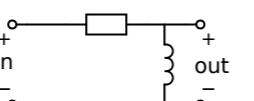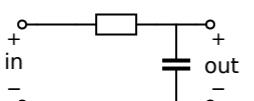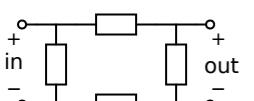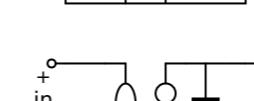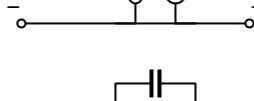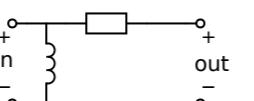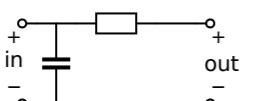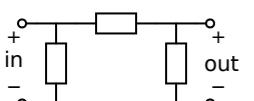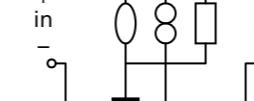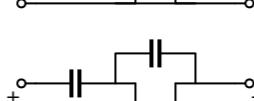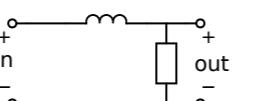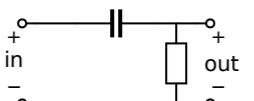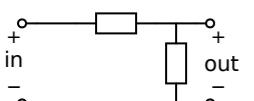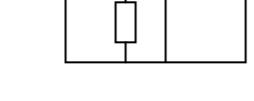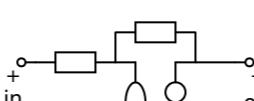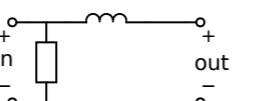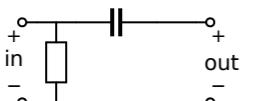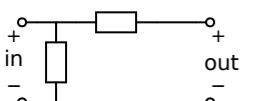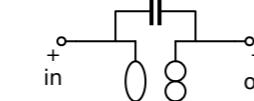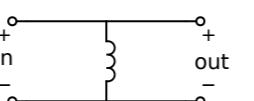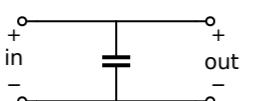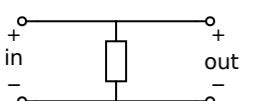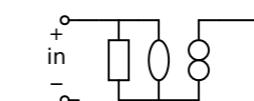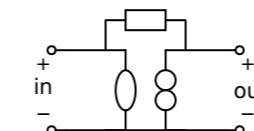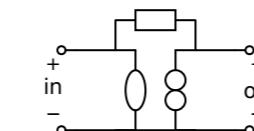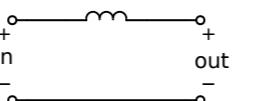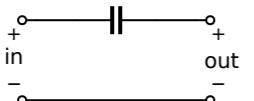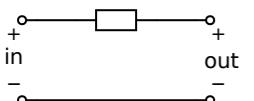
Script to check yourself
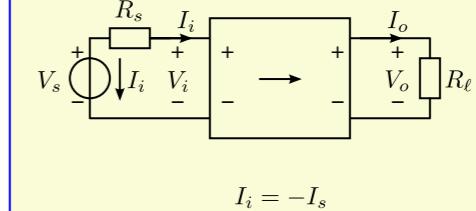
```
from SLiCAP import *
fileName = 'ABCD-test'
prj = initProject(fileName)
i1 = instruction()
i1.setCircuit(fileName + '.cir')
i1.setSimType('symbolic')
i1.setGainType('gain')
i1.setDataType('laplace')
i1.setSource('V1')
R_ell = sp.Symbol('R_ell')
i1.setDetector('V_i')
result = i1.execute()
V_i = result.laplace
i1.setDetector('I_V1')
result = i1.execute()
I_i = -result.laplace
i1.setDetector('V_o')
result = i1.execute()
V_o = result.laplace
i1.setDetector('I_R2')
result = i1.execute()
I_o = result.laplace
A = sp.limit(V_i/V_o, R_ell, 'oo')
B = sp.limit(V_i/I_o, R_ell, 0)
C = sp.limit(I_i/V_o, R_ell, 'oo')
D = sp.limit(I_i/I_o, R_ell, 0)
T1 = sp.Matrix([[A, B], [C, D]])
```

$I_i = -I_s$

$$\frac{V_i}{I_i}$$

$$\frac{V_o}{I_o}$$

$$T_1$$

Your own circuits here