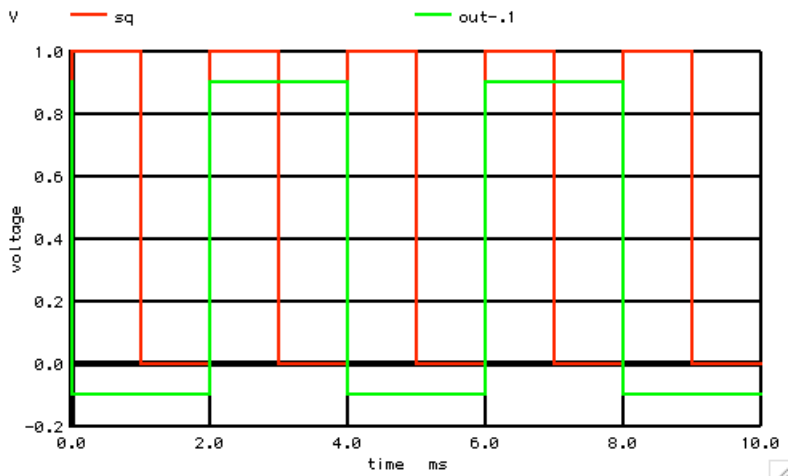


===== TOGGLE_FF_TESTS =====

BEHAVIORAL MODELING OF FLIP FLIPS WITH FEEDBACK
MAY BE DIFFICULT TO CONVERGE WITHOUT USING
BREAK BEFORE MAKE LOGIC.



TOGGLE_FF_TESTS

```

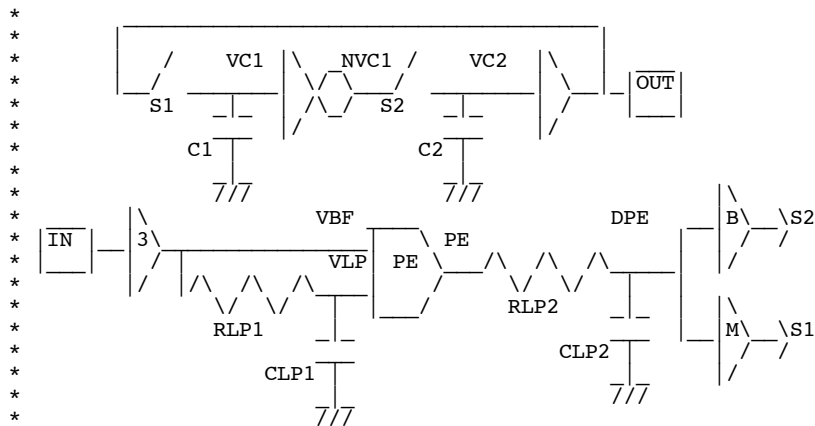
=====Create Signal=====
*.OPTIONS  GMIN=1p      METHOD=trap  ABSTOL=1m      TEMP=27      srcsteps = 1  gminsteps = 1
*.OPTIONS  RELTOL=.001 ABSTOL=1p    VNTOL=1u      ITL4=500     ITL1=400
*V PULSE#  NODE_P NODE_N DC      VALUE  PULSE( VINIT VPULSE TDELAY TRISE TFALL PWIDTH PERIOD )
VSQ       SQ      0      DC      0      PULSE( 0      1      1u      1u      1u      1m      2m )

XTOGGLE   SQ      OUT      TOGGLE

.control
set       pensize = 2
tran      1u      10m      0      1u
plot      sq      out-.1
.endc

```

*=====TOGGLE=====



```

.SUBCKT  TOGGLE  IN  OUT
BBUF    VBF    0      V =      u( v(IN )-.5 )
RLP     VBF    VLP    1k
CLP     VLP    0      5n
BAND    VPE    0      V =      u( u(v(VBF )-.5)*u(.5 -v(VLP ) ) -.5)
RLP2    VPE    VLP2   .3k
CLP2    VLP2   0      2n
BBRK    BRK    0      V =      1-u(v(VLP2 )-.2)
BMAK    MAK    0      V =      u(v(VLP2 )-.9)
S1      OUT    VC1    MAK    0      SW
S2      NVC1   VC2    BRK    0      SW
C1      VC1    0      10n
C2      VC2    0      10n
R1      VC1    0      10Meg
R2      VC2    0      10Meg
BINV    NVC1   0      V =      1-u(v(VC1)-.2)
BOUT    OUT    0      V =      u(v(VC2)-.2)

```

```
.ENDS TOGLE
.MODEL SW VT=.5 VH=.1 RON=1 ROFF=100MEG)
.end
```