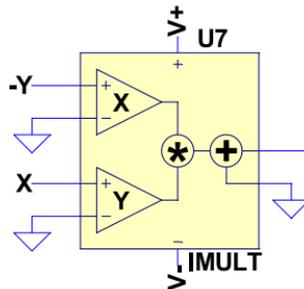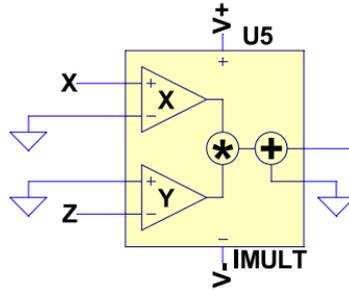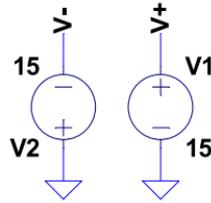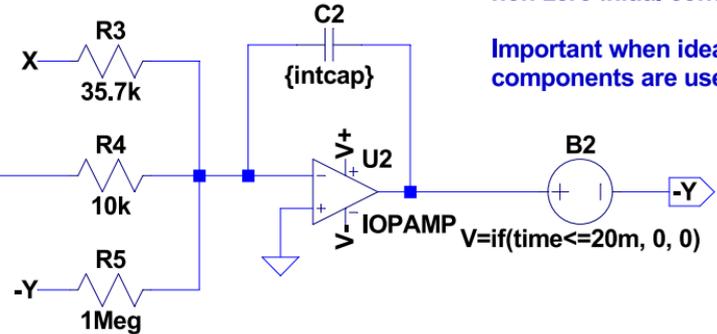# Lorenz

Several model files are included, and can be applied to both the multipliers and the operational amplifiers. Fastest simulation will be with IMULT & IOPAMP -- ideal devices clamped to the power rails. A more realistic simulation can be obtained with AD633JT (a more accurate behavioral model) & TL082. Note the more accurate multiplier models from ADI (AD633JNZ & AD633AN) can lead to tricky convergence. A good alternative amplifier is the LT1057.

.tran 0 15 2 1e-3 startup
.include AD633JT.sub
.include TL082.sub
.include AD633AN.sub
.include AD633JNZ.sub
.options plotwinsize=0
.include IOPAMP.sub
.include IMULT.sub
.param intcap=0.1u

intcap=0.01uF => Super Fast
intcap=0.10uF => Just Right
intcap=0.40uF => Super Slow

V-   V+
15   V1

V2   15

C1
{intcap}

-Y   R1   U3
      100k IOPAMP
X   R2
      100k

B1
X
V=if(time<=20m, 1.0, 0)
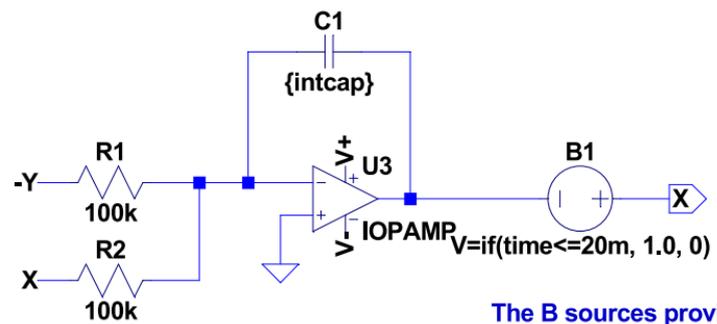
The B sources provide non-zero initial conditions.

Important when ideal components are used.

U5
X
*
+
Z
Y
IMULT

C2
{intcap}

X   R3   U2
     35.7k IOPAMP
     R4
     10k
-Y   R5
     1Meg

B2
-Y
V=if(time<=20m, 0, 0)

U7
-Y
*
+
X
Y
IMULT

C3
{intcap}

R6   U6
10k   IOPAMP
Z   R7
      374k

B3
Z
V=if(time<=20m, 0, 0)