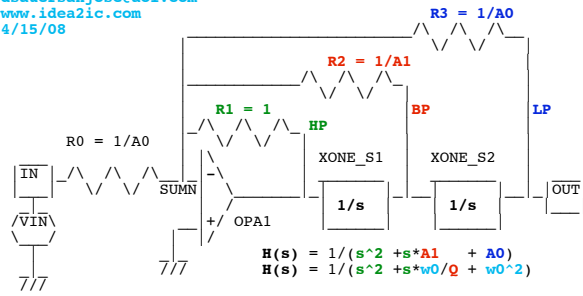


State_Variable_s_eq_1

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 * www.idea2ic.com
 * 4/15/08



$$H(s) = 1/(s^2 + s*A1 + A0)$$

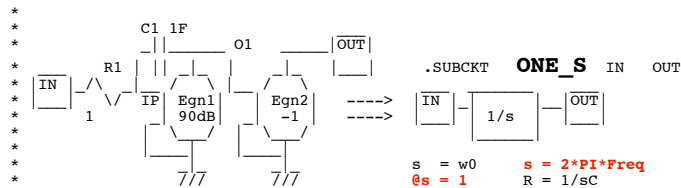
$$H(s) = 1/(s^2 + s*w0/Q + w0^2)$$

Set **A0 = 1** and **w0^2 = s^2 = 1**
 Then **R2 = Q** and **2*PI*0.159Hz = 1**

```
.OPTIONS GMIN=1e-18 METHOD=trap srcsteps = 1 gminsteps = 1
=====
V_IN     VIN      0      AC      1      DC      0
R0       VIN      SUMN    1
R1       SUMN     HP      1
R2       SUMN     BP      10
R3       SUMN     LP      1
XOPA1    SUMN     0       HP      OPA
XONES1   HP      BP      ONE_S
XONES2   BP      LP      ONE_S
.ac      dec      50      .01     1
```

==State_Variable_Filters_Map_Equations_To_Components==

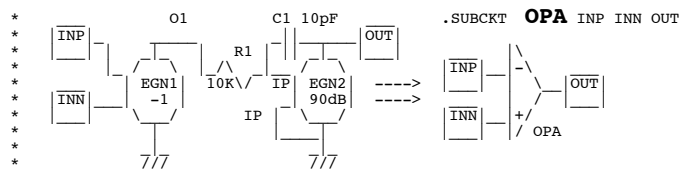
```
.control
run
plot db(bp) db(hp) db(lp) title StateVariable_Q_10
=====Feedback_Adjusts_Q=====
alter R2 resistance = 1
run
plot db(bp) db(hp) db(lp) title StateVariable_Q_1
.endc
```



$$s = w0 \quad s = 2*PI*Freq$$

$$@s = 1 \quad R = 1/sC$$

http://www.idea2ic.com/PlayWithJavascript/R_C_Freq.html



```
.SUBCKT OPA INP INN OUT
EGN1 O1 0 INP INN -1
EGN2 OUT 0 IP 0 -1000000
R1 O1 IP 10k
C1 OUT IP 10p
.ends
```

```

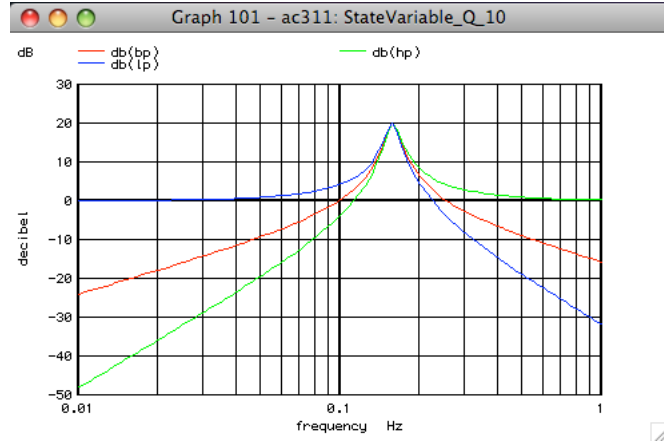
.SUBCKT ONE_S IN      OUT
EGN1  O1      0      IP    0      -1000000
EGN2  OUT     0      O1    0      -1
R1     IN      IP     1
C1     IP      O1     1
.ends

```

.end

=====END_OF_SPICE=====

Q is control by the ratio of R2 to the other resistors.
 For a Q=10 there is a peaking of 20dB.



For a Q=1 there is little peaking.

