Experiment: TIA simple Z5 ZL

Filter 1

Invalid filter
$Z(s)$: $(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ R_L)$
$H(s)$: $\frac{R_L(R_4g_m-1)}{R_4g_m+2R_Lg_m+1}$

Filter 2

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$
$H(s)$: $\frac{R_4g_m-1}{C_LR_4g_ms+C_Ls+2g_m}$

Filter 3

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$
$H(s)$: $\frac{R_L(R_4g_m-1)}{C_LR_4R_Lg_ms+C_LR_Ls+R_4g_m+2R_Lg_m+1}$

Filter 4

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ R_L+\frac{1}{C_Ls}\right)$
$H(s)$: $\frac{(R_4g_m-1)(C_LR_Ls+1)}{C_LR_4g_ms+2C_LR_Lg_ms+C_Ls+2g_m}$

Filter 5

Filter Type: BS
$Z(s)$: $\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ L_Ls+\frac{1}{C_Ls}\right)$
$H(s)$: $\frac{(R_4g_m-1)(C_LL_Ls^2+1)}{2C_LL_Lg_ms^2+C_LR_4g_ms+C_Ls+2g_m}$
Q: $\frac{2L_Lg_m\sqrt{\frac{1}{C_LL_L}}}{R_4g_m+1}$
ω_0: $\sqrt{\frac{1}{C_LL_L}}$
Bandwidth: $\frac{R_4g_m+1}{2L_Lg_m}$

Filter 6

Filter Type: BP
$Z(s)$: $\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$
$H(s)$: $\frac{L_Ls(R_4g_m-1)}{C_LL_LR_4g_ms^2+C_LL_Ls^2+2L_Lg_ms+R_4g_m+1}$
Q: $\frac{C_L\sqrt{\frac{1}{C_LL_L}}(R_4g_m+1)}{2g_m}$
ω_0: $\sqrt{\frac{1}{C_LL_L}}$
Bandwidth: $\frac{2g_m}{C_L(R_4g_m+1)}$

Filter 7

Filter Type: GE
$Z(s)$: $\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ L_Ls+R_L+\frac{1}{C_Ls}\right)$
$H(s)$: $\frac{(R_4g_m-1)(C_LL_Ls^2+C_LR_Ls+1)}{2C_LL_Lg_ms^2+C_LR_4g_ms+2C_LR_Lg_ms+C_Ls+2g_m}$
Q: $\frac{2L_Lg_m\sqrt{\frac{1}{C_LL_L}}}{R_4g_m+2R_Lg_m+1}$
ω_0: $\sqrt{\frac{1}{C_LL_L}}$
Bandwidth: $\frac{R_4g_m+2R_Lg_m+1}{2L_Lg_m}$
Qz: $\frac{L_L\sqrt{\frac{1}{C_LL_L}}}{R_L}$

Filter 8

Filter Type: BP
$Z(s)$: $\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{1}{C_Ls+\frac{1}{R_L}+\frac{1}{L_Ls}}\right)$
$H(s)$: $\frac{L_LR_Ls(R_4g_m-1)}{C_LL_LR_LR_4g_ms^2+C_LL_LR_Ls^2+L_LR_4g_ms+2L_LR_Lg_ms+L_Ls+R_4R_Lg_m+R_L}$
Q: $\frac{C_LR_L\sqrt{\frac{1}{C_LL_L}}(R_4g_m+1)}{R_4g_m+2R_Lg_m+1}$
ω_0: $\sqrt{\frac{1}{C_LL_L}}$
Bandwidth: $\frac{R_4g_m+2R_Lg_m+1}{C_LR_L(R_4g_m+1)}$

Filter 9

Filter Type: GE
$Z(s)$: $\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}+R_L\right)$
$H(s)$: $\frac{(R_4g_m-1)(C_LL_LR_Ls^2+L_Ls+R_L)}{C_LL_LR_4g_ms^2+2C_LL_LR_Lg_ms^2+C_LL_Ls^2+2L_Lg_ms+R_4g_m+2R_Lg_m+1}$
Q: $\frac{C_L\sqrt{\frac{1}{C_LL_L}}(R_4g_m+2R_Lg_m+1)}{2g_m}$
ω_0: $\sqrt{\frac{1}{C_LL_L}}$
Bandwidth: $\frac{2g_m}{C_L(R_4g_m+2R_Lg_m+1)}$
Qz: $C_LR_L\sqrt{\frac{1}{C_LL_L}}$

Filter 10

Filter Type: BS
$Z(s)$: $\left(\infty,\ \infty,\ R_3,\ \infty,\ \infty,\ \frac{R_L\left(L_Ls+\frac{1}{C_Ls}\right)}{L_Ls+R_L+\frac{1}{C_Ls}}\right)$
$H(s)$: $\frac{R_L(R_4g_m-1)(C_LL_Ls^2+1)}{C_LL_LR_4g_ms^2+2C_LL_LR_Lg_ms^2+C_LL_Ls^2+C_LR_4R_Lg_ms+C_LR_Ls+R_4g_m+2R_Lg_m+1}$
Q: $\frac{L_L\sqrt{\frac{1}{C_LL_L}}(R_4g_m+2R_Lg_m+1)}{R_L(R_4g_m+1)}$
ω_0: $\sqrt{\frac{1}{C_LL_L}}$
Bandwidth: $\frac{R_L(R_4g_m+1)}{L_L(R_4g_m+2R_Lg_m+1)}$

Filter 11

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ R_L\right)$
$H(s)$: $\frac{R_L(-C_4s+g_m)}{2C_4R_Lg_ms+C_4s+g_m}$

Filter 12

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3s},\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$
$H(s)$: $\frac{-C_4s+g_m}{s(C_4C_Ls+2C_4g_m+C_Lg_m)}$

Filter 13

Filter Type: Invalid011

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

$H(s)$: $\frac{R_L(-C_4 s+g_m)}{C_4 C_L R_L s^2+2C_4 R_L g_m s+C_4 s+C_L R_L g_m s+g_m}$

Q: $\frac{C_4 C_L R_L \sqrt{\frac{g_m}{C_4 C_L R_L}}}{2C_4 R_L g_m+C_4+C_L R_L g_m}$

ω_0: $\sqrt{\frac{g_m}{C_4 C_L R_L}}$

Bandwidth: $\frac{2C_4 R_L g_m+C_4+C_L R_L g_m}{C_4 C_L R_L}$

Filter 14

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ R_L+\frac{1}{C_L s}\right)$

$H(s)$: $-\frac{(C_4 s-g_m)(C_L R_L s+1)}{s(2C_4 C_L R_L g_m s+C_4 C_L s+2C_4 g_m+C_L g_m)}$

Filter 15

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s+\frac{1}{C_L s}\right)$

$H(s)$: $-\frac{(C_4 s-g_m)(C_L L_L s^2+1)}{s(2C_4 C_L L_L g_m s^2+C_4 C_L s+2C_4 g_m+C_L g_m)}$

Filter 16

Filter Type: Invalid110

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$H(s)$: $\frac{L_L s(-C_4 s+g_m)}{C_4 C_L L_L s^3+2C_4 L_L g_m s^2+C_4 s+C_L L_L g_m s^2+g_m}$

Q: $\frac{L_L g_m \sqrt{\frac{1}{L_L(2C_4+C_L)}}(2C_4+C_L)}{C_4}$

ω_0: $\sqrt{\frac{1}{L_L(2C_4+C_L)}}$

Bandwidth: $\frac{C_4}{L_L g_m(2C_4+C_L)}$

Filter 17

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s+R_L+\frac{1}{C_L s}\right)$

$H(s)$: $-\frac{(C_4 s-g_m)(C_L L_L s^2+C_L R_L s+1)}{s(2C_4 C_L L_L g_m s^2+2C_4 C_L R_L g_m s+C_4 C_L s+2C_4 g_m+C_L g_m)}$

Filter 18

Filter Type: Invalid110

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L+\frac{1}{L_L s}}}\right)$

$H(s)$: $\frac{L_L R_L s(-C_4 s+g_m)}{C_4 C_L L_L R_L s^3+2C_4 L_L R_L g_m s^2+C_4 L_L s^2+C_4 R_L s+C_L L_L R_L g_m s^2+L_L g_m s+R_L g_m}$

Q: $\frac{L_L \sqrt{\frac{R_L g_m}{L_L(2C_4 R_L g_m+C_4+C_L R_L g_m)}}(2C_4 R_L g_m+C_4+C_L R_L g_m)}{C_4 R_L+L_L g_m}$

ω_0: $\sqrt{\frac{R_L g_m}{L_L(2C_4 R_L g_m+C_4+C_L R_L g_m)}}$

Bandwidth: $\frac{C_4 R_L+L_L g_m}{L_L(2C_4 R_L g_m+C_4+C_L R_L g_m)}$

Filter 19

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}+R_L\right)$

$H(s)$: $-\frac{(C_4 s-g_m)(C_L L_L R_L s^2+L_L s+R_L)}{2C_4 C_L L_L R_L g_m s^3+C_4 C_L L_L s^3+2C_4 L_L g_m s^2+2C_4 R_L g_m s+C_4 s+C_L L_L g_m s^2+g_m}$

Filter 20

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$

$H(s)$: $-\frac{R_L(C_4 s-g_m)(C_L L_L s^2+1)}{2C_4 C_L L_L R_L g_m s^3+C_4 C_L L_L s^3+C_4 C_L R_L s^2+2C_4 R_L g_m s+C_4 s+C_L L_L g_m s^2+C_L R_L g_m s+g_m}$

Filter 21

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ \infty,\ \infty,\ R_L\right)$

$H(s)$: $\frac{R_L(-C_4 R_4 s+R_4 g_m-1)}{2C_4 R_4 R_L g_m s+C_4 R_4 s+R_4 g_m+2R_L g_m+1}$

Filter 22

Filter Type: Invalid011

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

$H(s)$: $\frac{-C_4 R_4 s+R_4 g_m-1}{C_4 C_L R_4 s^2+2C_4 R_4 g_m s+C_L R_4 g_m s+C_L s+2g_m}$

Q: $\frac{\sqrt{2C_4 C_L R_4}\sqrt{\frac{1}{C_4 C_L R_4}}}{2C_4 R_4 g_m+C_L R_4 g_m+C_L}$

ω_0: $\sqrt{2}\sqrt{\frac{g_m}{C_4 C_L R_4}}$

Bandwidth: $\frac{2C_4 R_4 g_m+C_L R_4 g_m+C_L}{C_4 C_L R_4}$

Filter 23

Filter Type: Invalid011

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

$H(s)$: $\frac{R_L(-C_4 R_4 s+R_4 g_m-1)}{C_4 C_L R_4 R_L s^2+2C_4 R_4 R_L g_m s+C_4 R_4 s+C_L R_4 R_L g_m s+C_L R_L s+R_4 g_m+2R_L g_m+1}$

Q: $\frac{C_4 C_L R_4 R_L \sqrt{\frac{R_4 g_m+2R_L g_m+1}{C_4 C_L R_4 R_L}}}{2C_4 R_4 R_L g_m+C_4 R_4+C_L R_4 R_L g_m+C_L R_L}$

ω_0: $\sqrt{\frac{R_4 g_m+2R_L g_m+1}{C_4 C_L R_4 R_L}}$

Bandwidth: $\frac{2C_4 R_4 R_L g_m+C_4 R_4+C_L R_4 R_L g_m+C_L R_L}{C_4 C_L R_4 R_L}$

Filter 24

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ \infty,\ \infty,\ R_L+\frac{1}{C_L s}\right)$

$H(s)$: $-\frac{(C_L R_L s+1)(C_4 R_4 s-R_4 g_m+1)}{2C_4 C_L R_4 R_L g_m s^2+C_4 C_L R_4 s^2+2C_4 R_4 g_m s+C_L R_4 g_m s+2C_L R_L g_m s+C_L s+2g_m}$

Filter 25

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3}{C_3 R_3 s+1},\ \infty,\ \infty,\ L_L s+\frac{1}{C_L s}\right)$

$H(s)$: $-\frac{(C_L L_L s^2+1)(C_4 R_4 s-R_4 g_m+1)}{2C_4 C_L L_L R_4 g_m s^3+C_4 C_L R_4 s^2+2C_4 R_4 g_m s+2C_4 L_L g_m s^2+C_L R_4 g_m s+C_L s+2g_m}$

Filter 26

Filter Type: Invalid110

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$

$H(s)$: $\frac{L_Ls(-C_4R_4s+R_4g_m-1)}{C_4C_LL_LR_4s^3+2C_4L_LR_4g_ms^2+C_4R_4s+C_LL_LR_4g_ms^2+C_LL_Ls^2+2L_Lg_ms+R_4g_m+1}$

Q: $\frac{L_L\sqrt{\frac{R_4g_m+1}{L_L(2C_4R_4g_m+C_L)}}(2C_4R_4g_m+C_LR_4g_m+C_L)}{C_4R_4+2L_Lg_m}$

ω_0: $\sqrt{\frac{R_4g_m+1}{L_L(2C_4R_4g_m+C_LR_4g_m+C_L)}}$

Bandwidth: $\frac{C_4R_4+2L_Lg_m}{L_L(2C_4R_4g_m+C_LR_4g_m+C_L)}$

Filter 27

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ L_Ls+R_L+\frac{1}{C_Ls}\right)$

$H(s)$: $-\frac{(C_4R_4s-R_4g_m+1)(C_LL_Ls^2+C_LR_Ls+1)}{2C_4C_LL_LR_4g_ms^3+2C_4C_LR_4R_Lg_ms^2+C_4C_LR_4s^2+2C_4R_4g_ms+2C_LL_Lg_ms^2+C_LR_4g_ms+2C_LR_Lg_ms+C_Ls+2g_m}$

Filter 28

Filter Type: Invalid110

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{1}{\frac{1}{C_Ls+\frac{1}{R_L}}+\frac{1}{L_Ls}}\right)$

$H(s)$: $\frac{L_LR_Ls(-C_4R_4s+R_4g_m-1)}{C_4C_LL_LR_4R_Ls^3+2C_4L_LR_4R_Lg_ms^2+C_4L_LR_4s^2+C_4R_4R_Ls+C_LL_LR_4R_Lg_ms^2+C_LL_LR_Ls^2+L_LR_4g_ms+2L_LR_Lg_ms+L_Ls+R_4R_Lg_m+R_L}$

Q: $\frac{L_L\sqrt{\frac{R_L(R_4g_m+1)}{L_L(2C_4R_4R_Lg_m+C_4R_4+C_LR_4R_Lg_m+C_LR_L)}}(2C_4R_4R_Lg_m+C_4R_4+C_LR_4R_Lg_m+C_LR_L)}{C_4R_4R_L+L_LR_4g_m+2L_LR_Lg_m+L_L}$

ω_0: $\sqrt{\frac{R_L(R_4g_m+1)}{L_L(2C_4R_4R_Lg_m+C_4R_4+C_LR_4R_Lg_m+C_LR_L)}}$

Bandwidth: $\frac{C_4R_4R_L+L_LR_4g_m+2L_LR_Lg_m+L_L}{L_L(2C_4R_4R_Lg_m+C_4R_4+C_LR_4R_Lg_m+C_LR_L)}$

Filter 29

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}+R_L\right)$

$H(s)$: $-\frac{(C_4R_4s-R_4g_m+1)(C_LL_LR_Ls^2+L_Ls+R_L)}{2C_4C_LL_LR_4R_Lg_ms^3+C_4C_LL_LR_4s^3+2C_4L_LR_4g_ms^2+2C_4R_4R_Lg_ms^2+C_4R_4s+C_LL_LR_4g_ms^2+2C_LL_LR_Lg_ms^2+C_LL_Ls^2+2L_Lg_ms+R_4g_m+2R_Lg_m+1}$

Filter 30

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3}{C_3R_3s+1},\ \infty,\ \infty,\ \frac{R_L\left(L_Ls+\frac{1}{C_Ls}\right)}{L_Ls+R_L+\frac{1}{C_Ls}}\right)$

$H(s)$: $-\frac{R_L\left(C_LL_Ls^2+1\right)(C_4R_4s-R_4g_m+1)}{2C_4C_LL_LR_4R_Lg_ms^3+C_4C_LL_LR_4R_Ls^3+C_4C_LR_4R_Ls^2+2C_4R_4R_Lg_ms^2+C_4R_4s+C_LL_LR_Lg_ms^2+2C_LL_LR_Lg_ms^2+C_LL_Ls^2+C_LR_4R_Lg_ms+C_LR_Ls+R_4g_m+2R_Lg_m+1}$

Filter 31

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ R_L\right)$

$H(s)$: $\frac{R_L(C_4R_4g_ms-C_4s+g_m)}{C_4R_4g_ms+2C_4R_Lg_ms+C_4s+g_m}$

Filter 32

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ \frac{1}{C_Ls}\right)$

$H(s)$: $\frac{C_4R_4g_ms-C_4s+g_m}{s(C_4C_LR_4g_ms+2C_4C_LR_Lg_ms+C_4C_Ls+2C_4g_m+C_Lg_m)}$

Filter 33

Filter Type: Invalid011

$Z(s)$: $\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ \frac{R_L}{C_LR_Ls+1}\right)$

$H(s)$: $\frac{R_L(C_4R_4g_ms-C_4s+g_m)}{C_4C_LR_4R_Lg_ms^2+C_4C_LR_Ls^2+C_4R_4g_ms+2C_4R_Lg_ms+C_4s+C_LR_Lg_ms+g_m}$

Q: $\frac{C_4C_LR_L\sqrt{\frac{R_4g_m+1}{C_4C_LR_L(R_4g_m+1)}}(R_4g_m+1)}{C_4R_4g_m+2C_4R_Lg_m+C_4+C_LR_Lg_m}$

ω_0: $\sqrt{\frac{R_4g_m+1}{C_4C_LR_L(R_4g_m+1)}}$

Bandwidth: $\frac{C_4R_4g_m+2C_4R_Lg_m+C_4+C_LR_Lg_m}{C_4C_LR_L(R_4g_m+1)}$

Filter 34

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ R_L+\frac{1}{C_Ls}\right)$

$H(s)$: $-\frac{(C_LR_Ls+1)(C_4R_4g_ms-C_4s+g_m)}{s(C_4C_LR_4g_ms+2C_4C_LR_Lg_ms+C_4C_Ls+2C_4g_m+C_Lg_m)}$

Filter 35

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ L_Ls+\frac{1}{C_Ls}\right)$

$H(s)$: $\frac{(C_LL_Ls^2+1)(C_4R_4g_ms-C_4s+g_m)}{s(2C_4C_LL_Lg_ms^2+C_4C_LR_4g_ms+C_4C_Ls+2C_4g_m+C_Lg_m)}$

Filter 36

Filter Type: Invalid110

$Z(s)$: $\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ \frac{L_Ls}{C_LL_Ls^2+1}\right)$

$H(s)$: $\frac{L_Ls(C_4R_4g_ms-C_4s+g_m)}{C_4C_LL_LR_4g_ms^3+C_4C_LL_Ls^2+2C_4L_Lg_ms^2+C_4R_4g_ms+C_4s+C_LL_Lg_ms^2+g_m}$

Q: $\frac{L_Lg_m\sqrt{\frac{1}{L_L(2C_4+C_L)}}(2C_4+C_L)}{C_4(R_4g_m+1)}$

ω_0: $\sqrt{\frac{1}{L_L(2C_4+C_L)}}$

Bandwidth: $\frac{C_4(R_4g_m+1)}{L_Lg_m(2C_4+C_L)}$

Filter 37

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ L_Ls+R_L+\frac{1}{C_Ls}\right)$

$H(s)$: $\frac{(C_LL_Ls^2+C_LR_Ls+1)(C_4R_4g_ms-C_4s+g_m)}{s(2C_4C_LL_Lg_ms^2+C_4C_LR_4g_ms+2C_4C_LR_Lg_ms+C_4C_Ls+2C_4g_m+C_Lg_m)}$

Filter 38

Filter Type: Invalid110

$Z(s)$: $\left(\infty,\ \infty,\ R_3+\frac{1}{C_3s},\ \infty,\ \infty,\ \frac{1}{C_Ls+\frac{1}{R_L}+\frac{1}{L_Ls}}\right)$

$H(s)$: $\frac{L_LR_Ls(C_4R_4g_ms-C_4s+g_m)}{C_4C_LL_LR_4R_Lg_ms^3+C_4C_LL_LR_4s^3+C_4L_LR_4g_ms^2+2C_4L_LR_Lg_ms^2+C_4L_Ls^2+C_4R_4R_Lg_ms+C_4R_Ls+C_LL_LR_Lg_ms^2+L_Lg_ms+R_Lg_m}$

Q: $\frac{L_L\sqrt{\frac{R_Lg_m}{L_L(C_4R_4g_m+2C_4R_Lg_m+C_4+C_LR_Lg_m)}}(C_4R_4g_m+2C_4R_Lg_m+C_4+C_LR_Lg_m)}{C_4R_4R_Lg_m+C_4R_L+L_Lg_m}$

ω_0: $\sqrt{\frac{R_Lg_m}{L_L(C_4R_4g_m+2C_4R_Lg_m+C_4+C_LR_Lg_m)}}$

Bandwidth: $\frac{C_4R_4R_Lg_m+C_4R_L+L_Lg_m}{L_L(C_4R_4g_m+2C_4R_Lg_m+C_4+C_LR_Lg_m)}$

Filter 39

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}+R_L\right)$
$H(s)$: $\frac{(C_4 R_4 g_m s-C_4 s+g_m)(C_L L_L R_L s^2+L_L s+R_L)}{C_4 C_L L_L R_4 g_m s^3+2C_4 C_L L_L R_L g_m s^3+C_4 C_L L_L s^3+2C_4 L_L g_m s^2+C_4 R_4 g_m s+2C_4 R_L g_m s+C_4 s+C_L L_L g_m s^2+g_m}$

Filter 40

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{g_m}{C_L s}}\right)$
$H(s)$: $\frac{R_L\left(C_L L_L s^2+1\right)(C_4 R_4 g_m s-C_4 s+g_m)}{C_4 C_L L_L R_4 g_m s^3+2C_4 C_L L_L R_L g_m s^3+C_4 C_L L_L s^3+C_4 C_L R_4 R_L g_m s^2+C_4 C_L R_L s^2+C_4 R_4 g_m s+2C_4 R_L g_m s+C_4 s+C_L L_L g_m s^2+C_L R_L g_m s+g_m}$

Filter 41

Filter Type: GE
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ R_L\right)$
$H(s)$: $\frac{R_L(C_4 L_4 g_m s^2-C_4 s+g_m)}{C_4 L_4 g_m s^2+2C_4 R_L g_m s+C_4 s+g_m}$
Q: $\frac{L_4 g_m\sqrt{\frac{1}{C_4 L_4}}}{2R_L g_m+1}$
ω_0: $\sqrt{\frac{1}{C_4 L_4}}$
Bandwidth: $\frac{2R_L g_m+1}{L_4 g_m}$
Qz: $-L_4 g_m\sqrt{\frac{1}{C_4 L_4}}$

Filter 42

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$
$H(s)$: $\frac{C_4 L_4 g_m s^2-C_4 s+g_m}{s(C_4 C_L L_4 g_m s^2+C_4 C_L s+2C_4 g_m+C_L g_m)}$

Filter 43

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$
$H(s)$: $\frac{R_L(C_4 L_4 g_m s^2-C_4 s+g_m)}{C_4 C_L L_4 R_L g_m s^3+C_4 C_L R_L s^2+C_4 L_4 g_m s^2+2C_4 R_L g_m s+C_4 s+C_L R_L g_m s+g_m}$

Filter 44

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ R_L+\frac{1}{C_L s}\right)$
$H(s)$: $\frac{(C_L R_L s+1)(C_4 L_4 g_m s^2-C_4 s+g_m)}{s(C_4 C_L L_4 g_m s^2+2C_4 C_L R_L g_m s+C_4 C_L s+2C_4 g_m+C_L g_m)}$

Filter 45

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s+\frac{1}{C_L s}\right)$
$H(s)$: $\frac{(C_L L_L s^2+1)(C_4 L_4 g_m s^2-C_4 s+g_m)}{s(C_4 C_L L_4 g_m s^2+2C_4 C_L L_L g_m s^2+C_4 C_L s+2C_4 g_m+C_L g_m)}$

Filter 46

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$
$H(s)$: $\frac{L_L s(C_4 L_4 g_m s^2-C_4 s+g_m)}{C_4 C_L L_L L_4 g_m s^4+C_4 C_L L_L L_4 R_L g_m s^3+C_4 C_L L_L s^3+C_4 L_4 g_m s^2+2C_4 L_L g_m s^2+C_4 s+C_L L_L g_m s^2+g_m}$

Filter 47

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s+R_L+\frac{1}{C_L s}\right)$
$H(s)$: $\frac{\left(C_L L_L s^2+C_L R_L s+1\right)(C_4 L_4 g_m s^2-C_4 s+g_m)}{s(C_4 C_L L_4 g_m s^2+2C_4 C_L L_L g_m s^2+2C_4 C_L C_L R_L g_m s+C_4 C_L s+2C_4 g_m+C_L g_m)}$

Filter 48

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L}+\frac{1}{L_L s}}\right)$
$H(s)$: $\frac{L_4 R_L s(C_4 L_4 g_m s^2-C_4 s+g_m)}{C_4 C_L L_4 L_L R_L g_m s^4+C_4 C_L L_4 L_L R_L s^3+C_4 L_4 L_L g_m s^3+C_4 L_4 R_L g_m s^2+2C_4 L_L R_L g_m s^2+C_4 L_L s^2+C_4 R_L s+C_L L_L R_L g_m s^2+L_L g_m s+R_L g_m}$

Filter 49

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}+R_L\right)$
$H(s)$: $\frac{(C_4 L_4 g_m s^2-C_4 s+g_m)\left(C_L L_L R_L s^2+L_L s+R_L\right)}{C_4 C_L L_4 L_L g_m s^4+2C_4 C_L L_L R_L g_m s^3+C_4 C_L L_L s^3+C_4 L_4 g_m s^2+2C_4 L_L g_m s^2+2C_4 R_L g_m s+C_4 s+C_L L_L g_m s^2+g_m}$

Filter 50

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{g_m}{C_L s}}\right)$
$H(s)$: $\frac{R_L\left(C_L L_L s^2+1\right)(C_4 L_4 g_m s^2-C_4 s+g_m)}{C_4 C_L L_4 L_L g_m s^4+C_4 C_L L_4 R_L g_m s^3+2C_4 C_L L_L R_L g_m s^3+C_4 C_L L_L s^3+C_4 C_L R_L s^2+C_4 L_4 g_m s^2+2C_4 R_L g_m s+C_4 s+C_L L_L g_m s^2+C_L R_L g_m s+g_m}$

Filter 51

Filter Type: GE
$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ R_L\right)$
$H(s)$: $\frac{R_L\left(-C_4 L_4 s^2+L_4 g_m s-1\right)}{2C_4 L_4 R_L g_m s^2+C_4 L_4 s^2+L_4 g_m s+2R_L g_m+1}$
Q: $\frac{C_4\sqrt{\frac{1}{C_4 L_4}}(2R_L g_m+1)}{g_m}$
ω_0: $\sqrt{\frac{1}{C_4 L_4}}$
Bandwidth: $\frac{g_m}{C_4(2R_L g_m+1)}$
Qz: $-\frac{C_4\sqrt{\frac{1}{C_4 L_4}}}{g_m}$

Filter 52

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$
$H(s)$: $\frac{-C_4 L_4 s^2+L_4 g_m s-1}{C_4 C_L L_4 s^3+2C_4 L_4 g_m s^2+C_L L_4 g_m s^2+C_L s+2g_m}$

Filter 53

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$
$H(s)$: $\frac{R_L\left(-C_4 L_4 s^2+L_4 g_m s-1\right)}{C_4 C_L L_4 R_L s^3+2C_4 L_4 R_L g_m s^2+C_4 L_4 s^2+C_L L_4 R_L g_m s^2+C_L R_L s+L_4 g_m s+2R_L g_m+1}$

Filter 54

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ R_L+\frac{1}{C_L s}\right)$
$H(s)$: $-\frac{(C_L R_L s+1)\left(C_4 L_4 s^2-L_4 g_m s+1\right)}{2C_4 C_L L_4 R_L g_m s^3+C_4 C_L L_4 s^3+2C_4 L_4 g_m s^2+C_L L_4 g_m s^2+2C_L R_L g_m s+C_L s+2g_m}$

Filter 55

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ L_L s+\frac{1}{C_L s}\right)$
$H(s)$: $-\frac{\left(C_L L_L s^2+1\right)\left(C_4 L_4 s^2-L_4 g_m s+1\right)}{2C_4 C_L L_4 L_L g_m s^4+C_4 C_L L_4 s^3+2C_4 L_4 g_m s^2+C_L L_4 g_m s^2+2C_L L_L g_m s^2+C_L s+2g_m}$

Filter 56

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$
$H(s)$: $\frac{L_L s\left(-C_4 L_4 s^2+L_4 g_m s-1\right)}{C_4 C_L L_4 L_L s^4+2C_4 L_4 L_L g_m s^3+C_4 L_4 s^2+C_L L_4 L_L g_m s^3+C_L L_L s^2+L_4 g_m s+2L_L g_m s+1}$

Filter 57

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ L_L s+R_L+\frac{1}{C_L s}\right)$
$H(s)$: $-\frac{\left(C_4 L_4 s^2-L_4 g_m s+1\right)\left(C_L L_L s^2+C_L R_L s+1\right)}{2C_4 C_L L_4 L_L g_m s^4+2C_4 C_L L_4 R_L g_m s^3+C_4 C_L L_4 s^3+2C_4 L_4 g_m s^2+C_L L_4 g_m s^2+2C_L L_L g_m s^2+2C_L R_L g_m s+C_L s+2g_m}$

Filter 58

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L+\frac{1}{L_L s}}}\right)$
$H(s)$: $\frac{L_L R_L s\left(-C_4 L_4 s^2+L_4 g_m s-1\right)}{C_4 C_L L_4 L_L R_L s^4+2C_4 L_4 L_L R_L g_m s^3+C_4 L_4 L_L s^3+C_4 L_4 R_L s^2+C_L L_4 L_L R_L g_m s^3+C_L L_L R_L s^2+L_4 L_L g_m s^2+L_4 R_L g_m s+2L_L R_L g_m s+L_L s+R_L}$

Filter 59

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}+R_L\right)$
$H(s)$: $-\frac{\left(C_4 L_4 s^2-L_4 g_m s+1\right)\left(C_L L_L R_L s^3+L_L s+R_L\right)}{2C_4 C_L L_4 L_L R_L g_m s^4+C_4 C_L L_4 L_L s^4+2C_4 L_4 L_L g_m s^3+2C_4 L_4 R_L g_m s^2+C_4 L_4 s^2+C_L L_4 L_L g_m s^3+2C_L L_L R_L g_m s^2+C_L L_L s^2+L_4 g_m s+2L_L g_m s+2R_L g_m+1}$

Filter 60

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1},\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$
$H(s)$: $-\frac{R_L\left(C_L L_L s^2+1\right)\left(C_4 L_4 s^2-L_4 g_m s+1\right)}{2C_4 C_L L_4 L_L R_L g_m s^4+C_4 C_L L_4 L_L s^4+C_4 C_L L_4 R_L s^3+2C_4 L_4 R_L g_m s^2+C_4 L_4 s^2+C_L L_4 L_L g_m s^3+C_L L_4 R_L g_m s^2+2C_L L_L R_L g_m s^2+C_L L_L s^2+C_L R_L s+L_4 g_m s+2R_L g_m+1}$

Filter 61

Filter Type: GE
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ R_L\right)$
$H(s)$: $\frac{R_L\left(C_4 L_4 g_m s^2+C_4 R_4 g_m s-C_4 s+g_m\right)}{C_4 L_4 g_m s^2+C_4 R_4 g_m s+2C_4 R_L g_m s+C_4 s+g_m}$
Q: $\frac{L_4 g_m \sqrt{\frac{1}{C_4 L_4}}}{R_4 g_m+2R_L g_m+1}$
ω_0: $\sqrt{\frac{1}{C_4 L_4}}$
Bandwidth: $\frac{R_4 g_m+2R_L g_m+1}{L_4 g_m}$
Qz: $\frac{L_4 g_m \sqrt{\frac{1}{C_4 L_4}}}{R_4 g_m-1}$

Filter 62

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$
$H(s)$: $\frac{C_4 L_4 g_m s^2+C_4 R_4 g_m s-C_4 s+g_m}{s\left(C_4 C_L L_4 g_m s^2+C_4 C_L R_4 g_m s+C_4 C_L s+2C_4 g_m+C_L g_m\right)}$

Filter 63

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$
$H(s)$: $\frac{R_L\left(C_4 L_4 g_m s^2+C_4 R_4 g_m s-C_4 s+g_m\right)}{C_4 C_L L_4 R_L g_m s^3+C_4 C_L R_4 R_L g_m s^2+C_4 C_L R_L s^2+C_4 L_4 g_m s^2+C_4 R_4 g_m s+2C_4 R_L g_m s+C_4 s+C_L R_L g_m s+g_m}$

Filter 64

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ R_L+\frac{1}{C_L s}\right)$
$H(s)$: $\frac{\left(C_L R_L s+1\right)\left(C_4 L_4 g_m s^2+C_4 R_4 g_m s-C_4 s+g_m\right)}{s\left(C_4 C_L L_4 g_m s^2+C_4 C_L R_4 g_m s+2C_4 C_L R_L g_m s+C_4 C_L s+2C_4 g_m+C_L g_m\right)}$

Filter 65

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s+\frac{1}{C_L s}\right)$
$H(s)$: $\frac{\left(C_L L_L s^2+1\right)\left(C_4 L_4 g_m s^2+C_4 R_4 g_m s-C_4 s+g_m\right)}{s\left(C_4 C_L L_4 g_m s^2+2C_4 C_L L_L g_m s^2+C_4 C_L R_4 g_m s+C_4 C_L s+2C_4 g_m+C_L g_m\right)}$

Filter 66

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$
$H(s)$: $\frac{L_L s\left(C_4 L_4 g_m s^2+C_4 R_4 g_m s-C_4 s+g_m\right)}{C_4 C_L L_4 L_L g_m s^4+C_4 C_L L_L R_4 g_m s^3+C_4 C_L L_L s^3+C_4 L_4 g_m s^3+2C_4 L_4 g_m s^2+C_4 R_4 g_m s+C_4 s+C_L L_L g_m s^2+g_m}$

Filter 67

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ L_L s+R_L+\frac{1}{C_L s}\right)$
$H(s)$: $\frac{\left(C_L L_L s^2+C_L R_L s+1\right)\left(C_4 L_4 g_m s^2+C_4 R_4 g_m s-C_4 s+g_m\right)}{s\left(C_4 C_L L_4 g_m s^2+2C_4 C_L L_L g_m s^2+C_4 C_L R_4 g_m s+2C_4 C_L R_L g_m s+C_4 C_L s+2C_4 g_m+C_L g_m\right)}$

Filter 68

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L+\frac{1}{L_L s}}}\right)$
$H(s)$: $\frac{L_L R_L s\left(C_4 L_4 g_m s^2+C_4 R_4 g_m s-C_4 s+g_m\right)}{C_4 C_L L_4 L_L R_L g_m s^4+C_4 C_L L_4 L_L R_4 R_L g_m s^3+C_4 C_L C_L L_4 R_L s^3+C_4 L_4 L_L g_m s^3+C_4 L_4 R_L g_m s^2+2C_4 L_4 L_L R_L g_m s^2+C_4 L_4 L_L s^2+C_4 L_4 R_4 R_L g_m s+C_4 R_4 L_4 s+C_L L_L R_L g_m s^2+L_L g_m s+R_L g_m}$

Filter 69

Invalid filter
$Z(s)$: $\left(\infty,\ \infty,\ L_3 s+R_3+\frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}+R_L\right)$
$H(s)$: $\frac{\left(C_L L_L R_L s^2+L_L s+R_L\right)\left(C_4 L_4 g_m s^2+C_4 R_4 g_m s-C_4 s+g_m\right)}{C_4 C_L L_4 L_L g_m s^4+C_4 C_L L_4 R_L g_m s^3+2C_4 C_L L_4 R_L g_m s^3+C_4 C_L L_4 s^3+C_4 L_4 g_m s^2+2C_4 L_4 g_m s^2+C_4 R_4 g_m s+2C_4 R_L g_m s+C_4 s+C_L L_4 g_m s^2+g_m}$

Filter 70

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$

$H(s)$: $\frac{R_L\left(C_L L_L s^2+1\right)\left(C_4 L_4 g_m s^2 + C_4 R_4 g_m s - C_4 s + g_m\right)}{C_4 C_L L_4 L_L g_m s^4 + C_4 C_L L_4 R_L g_m s^3 + C_4 C_L L_L R_4 g_m s^3 + 2C_4 C_L L_L R_4 g_m s^3 + 2C_4 C_L L_L R_L g_m s^3 + C_4 C_L L_L s^3 + C_4 C_L R_4 R_L g_m s^2 + C_4 C_L R_L s^2 + C_4 L_4 g_m s^2 + C_4 R_4 g_m s + 2C_4 R_L g_m s + C_4 s + C_L L_L g_m s^2 + C_L R_L g_m s + g_m}$

Filter 71

Filter Type: GE

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ R_L\right)$

$H(s)$: $\frac{R_L\left(-C_4 L_4 R_4 s^2 + L_4 R_4 g_m s - L_4 s - R_4\right)}{2C_4 L_4 R_4 R_L g_m s^2 + C_4 L_4 R_4 s^2 + L_4 R_4 g_m s + 2L_4 R_L g_m s + L_4 s + 2R_4 R_L g_m + R_4}$

Q: $\frac{C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}\left(2R_L g_m + 1\right)}{R_4 g_m + 2R_L g_m + 1}$

ω_0: $\sqrt{\frac{1}{C_4 L_4}}$

Bandwidth: $\frac{R_4 g_m + 2R_4 g_m + 1}{C_4 R_4 (2R_L g_m + 1)}$

Qz: $-\frac{C_4 R_4 \sqrt{\frac{1}{C_4 L_4}}}{R_4 g_m - 1}$

Filter 72

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

$H(s)$: $\frac{-C_4 L_4 R_4 s^2 + L_4 R_4 g_m s - L_4 s - R_4}{C_4 C_L L_4 R_4 s^3 + 2C_4 L_4 R_4 g_m s^2 + C_L L_4 R_4 g_m s^2 + C_L L_4 s^2 + C_L R_4 s + 2L_4 g_m s + 2R_4 g_m}$

Filter 73

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s + 1}\right)$

$H(s)$: $\frac{R_L\left(-C_4 L_4 R_4 s^2 + L_4 R_4 g_m s - L_4 s - R_4\right)}{C_4 C_L L_4 R_4 L_L s^3 + 2C_4 L_4 R_4 L_L g_m s^2 + C_4 L_4 R_4 s^2 + C_L L_4 R_4 L_L g_m s^2 + C_L L_4 R_4 L_L s^2 + C_L L_4 R_L g_m s^2 + C_L L_4 s^2 + C_L R_4 L_L s + L_4 R_4 g_m s + 2L_4 R_L g_m s + L_4 s + 2R_4 R_L g_m + R_4}$

Filter 74

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ R_L + \frac{1}{C_L s}\right)$

$H(s)$: $-\frac{\left(C_L R_L s + 1\right)\left(C_4 L_4 R_4 s^2 - L_4 R_4 g_m s + L_4 s + R_4\right)}{2C_4 C_L L_4 R_4 R_L g_m s^3 + C_4 C_L L_4 R_4 s^3 + 2C_4 L_4 R_4 g_m s^2 + C_L L_4 R_4 g_m s^2 + 2C_L L_4 R_L g_m s^2 + C_L L_4 s^2 + 2C_L R_4 R_L g_m s + C_L R_4 s + 2L_4 g_m s + 2R_4 g_m}$

Filter 75

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ L_L s + \frac{1}{C_L s}\right)$

$H(s)$: $-\frac{\left(C_L L_L s^2 + 1\right)\left(C_4 L_4 R_4 s^2 - L_4 R_4 g_m s + L_4 s + R_4\right)}{2C_4 C_L L_4 L_L R_4 g_m s^4 + C_4 C_L L_4 R_4 s^3 + 2C_4 L_4 R_4 g_m s^2 + 2C_L L_4 L_L g_m s^3 + C_L L_4 R_4 g_m s^2 + C_L L_4 s^2 + 2C_L L_L R_4 g_m s^2 + C_L R_4 s + 2L_4 g_m s + 2R_4 g_m}$

Filter 76

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1}\right)$

$H(s)$: $\frac{L_L s\left(-C_4 L_4 R_4 s^2 + L_4 R_4 g_m s - L_4 s - R_4\right)}{C_4 C_L L_4 L_L R_4 s^4 + 2C_4 L_4 L_L R_4 g_m s^3 + C_4 L_4 R_4 s^3 + C_L L_4 L_L R_4 g_m s^3 + C_L L_4 L_L s^3 + C_L L_L R_4 s^3 + 2L_4 L_L g_m s^2 + L_4 R_4 g_m s + L_4 s + 2L_L R_4 g_m s + R_4}$

Filter 77

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ L_3 s + R_3 + \frac{1}{C_3 s},\ \infty,\ \infty,\ R_L\right)$

$H(s)$: $-\frac{\left(C_L R_L s + 1\right)\left(C_4 L_4 R_4 s^2 - L_4 R_4 g_m s + L_4 s + R_4\right)}{2C_4 C_L L_4 L_L R_4 g_m s^4 + C_4 C_L L_4 R_4 s^3 + 2C_4 L_4 R_4 g_m s^2 + C_L L_4 R_4 g_m s^2 + 2C_L L_4 R_L g_m s^2 + C_L L_4 s^2 + 2C_L R_4 R_L g_m s + C_L R_4 s + 2L_4 g_m s + 2R_4 g_m}$

Filter 78

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s + \frac{1}{R_L} + \frac{1}{L_L s}}\right)$

$H(s)$: $\frac{L_L R_L s\left(-C_4 L_4 R_4 s^2 + L_4 R_4 g_m s - L_4 s - R_4\right)}{C_4 C_L L_4 L_L R_4 R_L s^4 + 2C_4 L_4 L_L R_4 R_L g_m s^3 + C_4 L_4 L_L R_4 s^3 + C_4 L_4 R_4 R_L s^2 + C_L L_4 L_L R_4 R_L g_m s^3 + C_L L_4 L_L R_L s^3 + C_L L_L R_4 R_L s^3 + L_4 L_L R_4 g_m s^2 + 2L_4 L_L R_L g_m s^2 + L_4 L_L s^2 + L_4 R_4 R_L g_m s + L_4 R_L s + 2L_L R_4 R_L g_m s + L_L R_4 s + R_4 R_L}$

Filter 79

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2 + 1} + R_L\right)$

$H(s)$: $\frac{\left(C_L L_L R_L s^2 + L_L s + R_L\right)\left(C_4 L_4 R_4 s^2 - L_4 R_4 g_m s + L_4 s + R_4\right)}{2C_4 C_L L_4 L_L R_4 R_L g_m s^4 + C_4 C_L L_4 L_L R_4 s^4 + 2C_4 L_4 L_L R_4 g_m s^3 + 2C_4 L_4 R_4 R_L g_m s^2 + C_4 L_4 R_4 s^2 + C_L L_4 L_L R_4 g_m s^3 + 2C_L L_4 L_L R_L g_m s^3 + C_L L_4 L_L s^3 + 2C_L L_L R_4 R_L g_m s^2 + C_L L_L R_4 s^2 + 2L_4 L_L g_m s^2 + L_4 R_4 g_m s + 2L_4 R_L g_m s + L_4 s + 2L_L R_4 g_m s + 2R_4 R_L g_m + R_4}$

Filter 80

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{1}{C_3 s + \frac{1}{R_3} + \frac{1}{L_3 s}},\ \infty,\ \infty,\ \frac{R_L\left(L_L s + \frac{1}{C_L s}\right)}{L_L s + R_L + \frac{1}{C_L s}}\right)$

$H(s)$: $-\frac{R_L\left(C_L L_L s^2 + 1\right)\left(C_4 L_4 R_4 s^2 - L_4 R_4 g_m s + L_4 s + R_4\right)}{2C_4 C_L L_4 L_L R_4 R_L g_m s^4 + C_4 C_L L_4 L_L R_4 s^4 + C_4 C_L L_4 R_4 R_L s^3 + 2C_4 L_4 L_L R_4 g_m s^3 + C_4 L_4 R_4 s^3 + C_L L_4 L_L R_4 g_m s^3 + 2C_L L_4 L_L R_L g_m s^3 + C_L L_4 L_L s^3 + C_L L_4 R_4 R_L g_m s^2 + C_L L_4 R_L s^2 + 2C_L L_L R_4 R_L g_m s^2 + C_L L_L R_4 s^2 + C_L R_4 R_L s + L_4 R_4 g_m s + 2L_4 R_L g_m s + L_4 s + 2R_4 R_L g_m + R_4}$

Filter 81

Filter Type: GE

$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3,\ \infty,\ \infty,\ R_L\right)$

$H(s)$: $\frac{R_L\left(C_4 L_4 R_4 g_m s^2 - C_4 L_4 s^2 + L_4 g_m s + R_4 g_m - 1\right)}{C_4 L_4 R_4 g_m s^2 + 2C_4 L_4 R_L g_m s^2 + C_4 L_4 s^2 + L_4 g_m s + R_4 g_m + 2R_L g_m + 1}$

Q: $\frac{C_4 \sqrt{\frac{1}{C_4 L_4}}\left(R_4 g_m + 2R_L g_m + 1\right)}{g_m}$

ω_0: $\sqrt{\frac{1}{C_4 L_4}}$

Bandwidth: $\frac{g_m}{C_4\left(R_4 g_m + 2R_L g_m + 1\right)}$

Qz: $\frac{C_4 \sqrt{\frac{1}{C_4 L_4}}\left(R_4 g_m - 1\right)}{g_m}$

Filter 82

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3,\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

$H(s)$: $\frac{C_4 L_4 R_4 g_m s^2 - C_4 L_4 s^2 + L_4 g_m s + R_4 g_m - 1}{C_4 C_L L_4 R_4 g_m s^3 + C_4 C_L L_4 s^3 + 2C_4 L_4 g_m s^2 + C_L L_4 g_m s^2 + C_L R_4 g_m s + C_L s + 2g_m}$

Filter 83

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2 + 1} + R_3,\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s + 1}\right)$

$H(s)$: $\frac{R_L\left(C_4 L_4 R_4 g_m s^2 - C_4 L_4 s^2 + L_4 g_m s + R_4 g_m - 1\right)}{C_4 C_L L_4 R_4 R_L g_m s^3 + C_4 C_L L_4 R_L s^3 + C_4 L_4 R_4 g_m s^2 + 2C_4 L_4 R_L g_m s^2 + C_4 L_4 s^2 + C_L L_4 R_L g_m s^2 + C_L R_4 R_L g_m s + C_L R_L s + L_4 g_m s + R_4 g_m + 2R_L g_m + 1}$

Filter 84

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ R_L+\frac{1}{C_L s}\right)$

$H(s)$: $\frac{(C_L R_L s+1)\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2+L_4 g_m s+R_4 g_m-1\right)}{C_4 C_L L_4 R_4 g_m s^3+2C_4 C_L L_4 R_L g_m s^3+C_4 C_L L_4 s^3+2C_4 L_4 g_m s^2+C_L L_4 g_m s^2+C_L R_4 g_m s+2C_L R_L g_m s+C_L s+2g_m}$

Filter 85

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ L_L s+\frac{1}{C_L s}\right)$

$H(s)$: $\frac{\left(C_L L_L s^2+1\right)\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2+L_4 g_m s+R_4 g_m-1\right)}{2C_4 C_L L_4 L_L g_m s^4+C_4 C_L L_4 R_4 g_m s^3+C_4 C_L L_4 s^3+2C_4 L_4 g_m s^2+C_L L_4 g_m s^2+2C_L L_L g_m s^2+C_L R_4 g_m s+C_L s+2g_m}$

Filter 86

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$H(s)$: $\frac{L_L s\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2+L_4 g_m s+R_4 g_m-1\right)}{C_4 C_L L_4 L_L R_4 g_m s^4+C_4 C_L L_4 L_L s^4+2C_4 L_4 L_L g_m s^3+C_4 L_4 R_4 g_m s^2+C_4 L_4 s^2+C_L L_4 L_L g_m s^3+C_L L_L R_4 g_m s^2+C_L L_L s^2+L_4 g_m s+2L_L g_m s+R_4 g_m+1}$

Filter 87

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ L_L s+R_L+\frac{1}{C_L s}\right)$

$H(s)$: $\frac{\left(C_L L_L s^2+C_L R_L s+1\right)\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2+L_4 g_m s+R_4 g_m-1\right)}{2C_4 C_L L_4 L_L g_m s^4+C_4 C_L L_4 R_4 g_m s^3+2C_4 C_L L_4 L_L R_L g_m s^3+C_4 C_L L_4 s^3+2C_4 L_4 g_m s^2+C_L L_4 g_m s^2+2C_L L_L g_m s^2+C_L R_4 g_m s+2C_L R_L g_m s+C_L s+2g_m}$

Filter 88

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L+\frac{1}{L_L s}}}\right)$

$H(s)$: $\frac{L_L R_L s\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2+L_4 g_m s+R_4 g_m-1\right)}{C_4 C_L L_4 L_L R_4 R_L g_m s^4+C_4 C_L L_4 L_L R_4 L_L s^4+C_4 L_4 L_L R_4 g_m s^3+2C_4 L_4 L_L L_L R_L g_m s^3+C_4 L_4 L_L L_L s^3+C_4 L_4 R_4 R_L g_m s^2+C_4 L_4 R_4 L_L s^2+C_L L_4 L_L R_4 R_L g_m s^2+C_L L_4 L_L L_L g_m s^2+C_L L_L R_4 R_L g_m s^2+C_L L_L R_L s^2+L_4 L_L g_m s^2+L_4 R_4 g_m s+L_4 R_4 g_m s+2L_L R_L g_m s+L_L s+R_4 R_L g_m s+R_L}$

Filter 89

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}+R_L\right)$

$H(s)$: $\frac{\left(C_L L_L R_L s^2+L_L s+R_L\right)\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2+L_4 g_m s+R_4 g_m-1\right)}{C_4 C_L L_4 L_L R_4 g_m s^4+2C_4 C_L L_4 L_L R_L g_m s^4+C_4 C_L L_4 L_L s^4+2C_4 L_4 L_L g_m s^3+C_4 L_4 R_4 g_m s^2+2C_4 L_4 R_L g_m s^2+C_4 L_4 s^2+C_L L_4 L_L g_m s^3+C_L L_L R_4 g_m s^2+2C_L L_L R_L g_m s^2+C_L L_L s^2+L_4 g_m s+2L_L g_m s+R_4 g_m+2R_L g_m+1}$

Filter 90

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{L_3 s}{C_3 L_3 s^2+1}+R_3,\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$

$H(s)$: $\frac{R_L\left(C_L L_L s^2+1\right)\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2+L_4 g_m s+R_4 g_m-1\right)}{C_4 C_L L_4 L_L R_4 g_m s^4+2C_4 C_L L_4 L_L R_L g_m s^4+C_4 C_L L_4 L_L s^4+C_4 C_L L_4 R_4 L_L g_m s^3+C_4 C_L L_4 R_L s^3+C_4 L_4 R_4 g_m s^2+2C_4 L_4 R_L g_m s^2+C_4 L_4 s^2+C_L L_4 L_L g_m s^3+C_L L_4 R_4 L_L g_m s^2+2C_L L_4 R_L L_L g_m s^2+C_L L_4 L_L s^2+C_L R_4 L_L g_m s+C_L R_L s+L_4 g_m s+R_4 g_m+2R_L g_m+1}$

Filter 91

Filter Type: GE

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ R_L\right)$

$H(s)$: $\frac{R_L\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2-C_4 R_4 s+R_4 g_m-1\right)}{C_4 L_4 R_4 g_m s^2+2C_4 L_4 R_L g_m s^2+C_4 L_4 s^2+2C_4 R_4 R_L g_m s+C_4 R_4 s+R_4 g_m+2R_L g_m+1}$

Q: $\frac{L_4\sqrt{\frac{1}{C_4 L_4}}\left(R_4 g_m+2R_L g_m+1\right)}{R_4\left(2R_L g_m+1\right)}$

ω_0: $\sqrt{\frac{1}{C_4 L_4}}$

Bandwidth: $\frac{R_4\left(2R_L g_m+1\right)}{L_4\left(R_4 g_m+2R_L g_m+1\right)}$

Qz: $\frac{L_4\sqrt{\frac{1}{C_4 L_4}}\left(-R_4 g_m+1\right)}{R_4}$

Filter 92

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s}\right)$

$H(s)$: $\frac{C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2-C_4 R_4 s+R_4 g_m-1}{C_4 C_L L_4 R_4 g_m s^3+C_4 C_L L_4 s^3+C_4 C_L R_4 s^2+2C_4 L_4 g_m s^2+2C_4 L_4 g_m s+C_L R_4 g_m s+C_L s+2g_m}$

Filter 93

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{R_L}{C_L R_L s+1}\right)$

$H(s)$: $\frac{R_L\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2-C_4 R_4 s+R_4 g_m-1\right)}{C_4 C_L L_4 R_4 L_L g_m s^3+C_4 C_L L_4 R_L s^3+C_4 C_L R_4 R_L s^2+C_4 L_4 R_4 g_m s^2+2C_4 L_4 R_L g_m s^2+C_4 L_4 s^2+2C_4 R_4 R_L g_m s+C_4 R_4 s+C_L R_4 R_L g_m s+C_L R_L s+R_4 g_m+2R_L g_m+1}$

Filter 94

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ R_L+\frac{1}{C_L s}\right)$

$H(s)$: $-\frac{\left(C_L R_L s+1\right)\left(-C_4 L_4 R_4 g_m s^2+C_4 L_4 s^2+C_4 R_4 s-R_4 g_m+1\right)}{C_4 C_L L_4 R_4 g_m s^3+2C_4 C_L L_4 R_L g_m s^3+C_4 C_L L_4 s^3+2C_4 C_L R_4 R_L g_m s^2+C_4 C_L R_4 s^2+2C_4 L_4 g_m s^2+2C_4 R_4 g_m s+C_L R_4 g_m s+2C_L R_L g_m s+C_L s+2g_m}$

Filter 95

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ L_L 8+\frac{1}{C_L s}\right)$

$H(s)$: $-\frac{\left(C_L L_L s^2+1\right)\left(-C_4 L_4 R_4 g_m s^2+C_4 L_4 s^2+C_4 R_4 s-R_4 g_m+1\right)}{2C_4 C_L L_4 L_L g_m s^4+C_4 C_L L_4 R_4 g_m s^3+C_4 C_L L_4 s^3+2C_4 C_L L_L R_4 g_m s^3+C_4 C_L R_4 s^2+2C_4 L_4 g_m s^2+2C_4 R_4 g_m s+2C_L L_L g_m s^2+C_L R_4 g_m s+C_L s+2g_m}$

Filter 96

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}\right)$

$H(s)$: $\frac{L_L s\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2-C_4 R_4 s+R_4 g_m-1\right)}{C_4 C_L L_4 L_L R_4 g_m s^4+C_4 C_L L_4 L_L s^4+C_4 C_L L_L R_4 s^3+2C_4 L_4 L_L g_m s^3+C_4 L_4 R_4 g_m s^2+C_4 L_4 s^2+2C_4 L_L R_4 g_m s^2+C_L L_4 L_L g_m s^3+C_L L_L R_4 g_m s^2+C_L L_L s^2+L_4 g_m s+2L_L g_m s+R_4 g_m+1}$

Filter 97

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ L_L 8+R_L+\frac{1}{C_L s}\right)$

$H(s)$: $-\frac{\left(C_L L_L s^2+C_L R_L s+1\right)\left(-C_4 L_4 R_4 g_m s^2+C_4 L_4 s^2+C_4 R_4 s-R_4 g_m+1\right)}{2C_4 C_L L_4 L_L g_m s^4+C_4 C_L L_4 R_4 g_m s^3+2C_4 C_L L_4 R_L g_m s^3+C_4 C_L L_4 s^3+2C_4 C_L L_L R_4 g_m s^3+2C_4 C_L R_4 R_L g_m s^2+C_4 C_L R_4 s^2+2C_4 L_4 g_m s^2+2C_4 R_4 g_m s+2C_L L_L g_m s^2+C_L R_4 g_m s+2C_L R_L g_m s+C_L s+2g_m}$

Filter 98

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{1}{C_L s+\frac{1}{R_L+\frac{1}{L_L s}}}\right)$

$H(s)$: $\frac{L_L R_L s\left(C_4 L_4 R_4 g_m s^2-C_4 L_4 s^2-C_4 R_4 s+R_4 g_m-1\right)}{C_4 C_L L_4 L_L R_4 R_L g_m s^4+C_4 C_L L_4 L_L R_4 L_L s^4+C_4 C_L L_4 L_L R_L s^4+C_4 L_4 L_L R_4 R_L g_m s^3+2C_4 L_4 L_L R_L R_L g_m s^3+C_4 L_4 L_L s^3+C_4 L_4 R_4 R_L g_m s^2+C_4 L_4 R_4 L_L s^2+2C_4 L_4 R_L R_L g_m s^2+C_4 L_4 R_L s^2+C_L L_4 R_4 R_L g_m s^2+C_L L_4 L_L R_4 g_m s^2+C_L L_4 L_L R_L s^2+L_4 R_4 g_m s+L_4 R_4 g_m s+2L_4 R_L g_m s+L_4 s+R_4 R_L g_m s+R_L}$

Filter 99

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{L_L s}{C_L L_L s^2+1}+R_L\right)$

$H(s)$: $-\frac{\left(C_L L_L R_L s^2+L_L s+R_L\right)\left(-C_4 L_4 R_4 g_m s^2+C_4 L_4 s^2+C_4 R_4 s-R_4 g_m+1\right)}{C_4 C_L L_4 L_L R_4 g_m s^4+2 C_4 C_L L_4 L_L R_4 g_m s^3+C_4 C_L L_4 L_L s^3+2 C_4 C_L L_L R_4 R_L g_m s^3+C_4 C_L L_L R_4 s^3+2 C_4 L_4 L_L g_m s^3+C_4 L_4 R_4 g_m s^3+2 C_4 L_4 R_L g_m s^2+C_4 L_4 s^2+2 C_4 L_L R_4 g_m s^2+2 C_4 R_4 R_L g_m s+C_4 R_4 s+C_L L_L R_4 g_m s^2+2 C_L L_L R_L g_m s^2+C_L L_L s^2+2 L_L g_m s+R_4 g_m+2 R_L g_m+1}$

Filter 100

Invalid filter

$Z(s)$: $\left(\infty,\ \infty,\ \frac{R_3\left(L_3 s+\frac{1}{C_3 s}\right)}{L_3 s+R_3+\frac{1}{C_3 s}},\ \infty,\ \infty,\ \frac{R_L\left(L_L s+\frac{1}{C_L s}\right)}{L_L s+R_L+\frac{1}{C_L s}}\right)$

$H(s)$: $-\frac{R_L\left(C_L L_L s^2+1\right)\left(-C_4 L_4 R_4 g_m s^2+C_4 L_4 s^2+C_4 R_4 s-R_4 g_m+1\right)}{C_4 C_L L_4 L_L R_4 g_m s^4+2 C_4 C_L L_4 L_L R_4 g_m s^3+C_4 C_L L_4 L_L s^3+C_4 C_L L_L R_4 R_L g_m s^3+C_4 C_L L_4 R_L s^3+2 C_4 C_L L_L R_4 R_L g_m s^2+C_4 C_L L_L R_4 s^2+C_4 C_L L_4 R_4 g_m s^2+2 C_4 L_4 L_L R_L g_m s^2+C_4 L_4 s^2+2 C_4 L_L R_4 R_L g_m s+C_4 L_4 s+C_L L_L R_4 g_m s^2+2 C_L L_L R_L g_m s^2+C_L L_L s^2+C_L R_4 R_L g_m s+C_L R_L s+R_4 g_m+2 R_L g_m+1}$