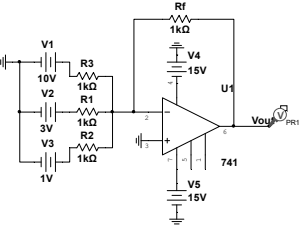
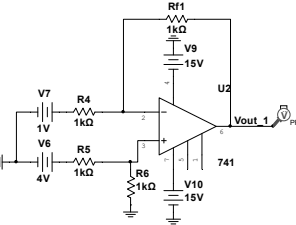


ADDER USING OPAMP 741



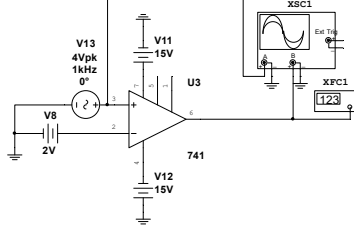
$$V_{out} = -R_f [V_1 + V_2 + V_3] / R$$

SUBTRACTOR USING OPAMP 741

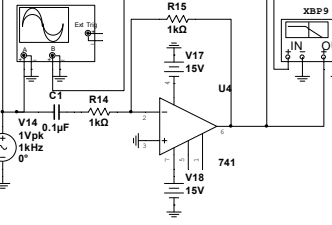


$$V_{out} = R_{f1} [V_2 - V_1] / R_4$$

COMPARATOR USING OPAMP 741

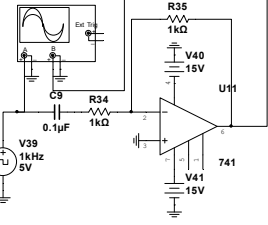


DIFFERENTIATOR USING OPAMP 741



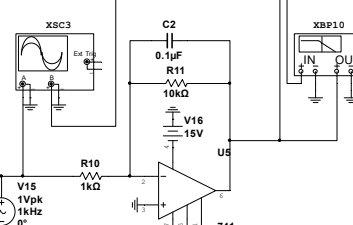
FREQUENCY RESPONSE
$$F_c = 1/(2\pi \cdot R_{14} \cdot C_1)$$

DIFFERENTIATOR USING OPAMP 741



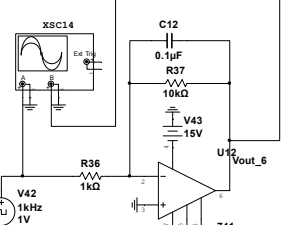
$$V_{out} = -RC [dV_i/dt]$$

INTEGRATOR USING OPAMP 741



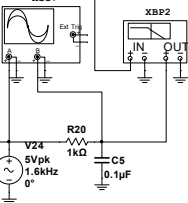
FREQUENCY RESPONSE
$$F_c = 1/(2\pi \cdot R_{11} \cdot C_2)$$

INTEGRATOR USING OPAMP 741

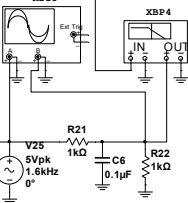


$$V_{out} = -1 / RC \int (V_i dt)$$

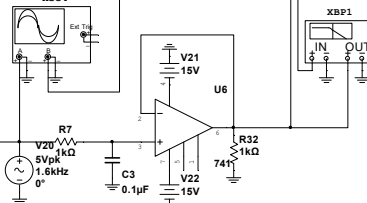
FIRST ORDER LPF



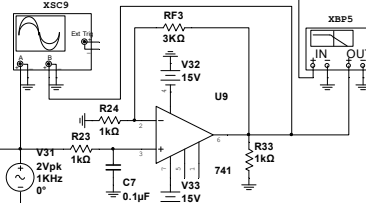
FIRST ORDER LPF WITH DIRECT LOAD



ACTIVE FIRST ORDER LPF USING OPAMP 741 WITH UNITY GAIN

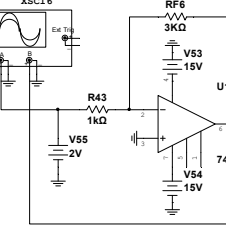


ACTIVE FIRST ORDER LPF USING OPAMP 741 WITH Av GAIN



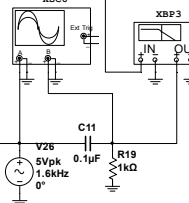
$$A_v = 1 + (R_{f3}/R_{24}) = 4$$

INVERTING USING OPAMP 741

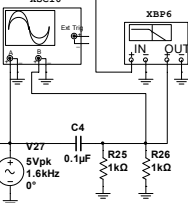


$$A_v = -(R_{f6}/R_{43})$$

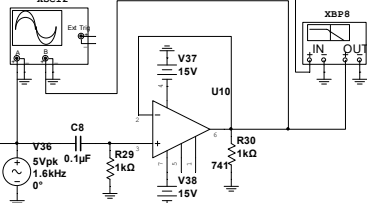
FIRST ORDER HPF



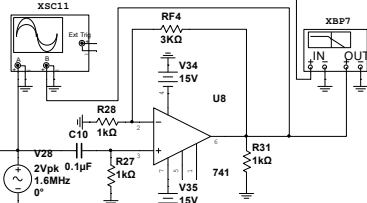
FIRST ORDER HPF WITH DIRECT LOAD



ACTIVE FIRST ORDER HPF USING OPAMP 741 WITH UNITY GAIN

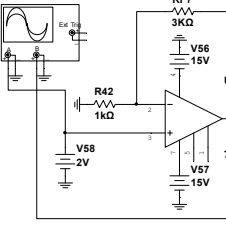


ACTIVE FIRST ORDER HPF USING OPAMP 741 WITH Av GAIN



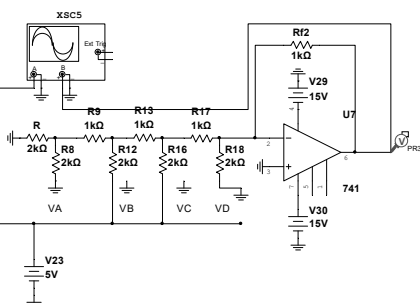
$$A_v = 1 + (R_{f4}/R_{28}) = 4$$

NON-INVERTING USING OPAMP 741



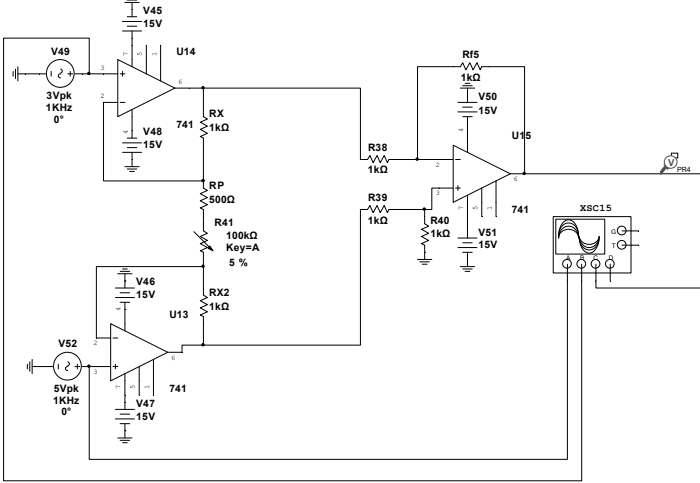
$$A_v = 1 + (R_{f7}/R_{42})$$

R-2R USING OPAMP 741



$$V_{OUT} = (8 \cdot V_D + 4 \cdot V_C + 2 \cdot V_B + 1 \cdot V_A) / (2^4)$$

INSTRUMENTATION AMPLIFIER



$$V_{OUT} = R_{f5}/R_{38} [(V_{52} - V_{49}) / (1 + (2R_X/R_G))] = 2(V_{52} - V_{49})$$