

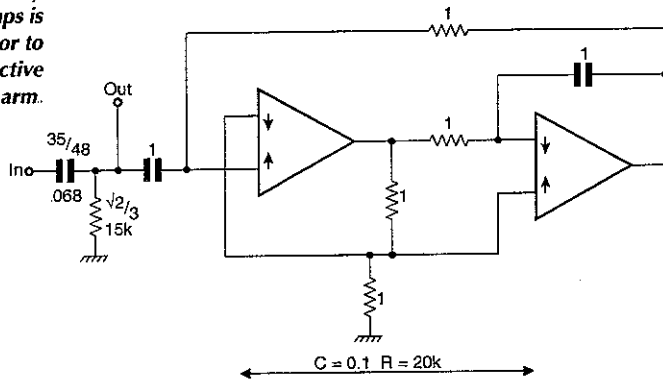
# Simpler thd meter

Although based on the design by Hickman<sup>1</sup>, this variant employs fewer components.

Values shown are normalised to  $\omega=1$ ; the curve was obtained using these values. I based calculations on a unity gain at  $\omega=2$  and  $\omega=3$ .

Most of the circuit appears as inductance to earth; other methods of doing this exist, but this one does not need

Front end for a thd meter, which produces the response shown. Circuitry around the op-amps is effectively a gyrator to simulate the inductive arm.

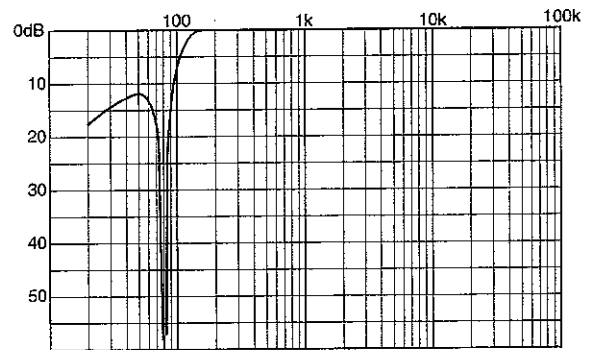


critical components. An obvious disadvantage of the circuit is its fixed frequency.

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**Reference**

1. Hickman, Ian. High-performance thd meter *Electronics World + Wireless World*, January 1996, p52.



# Two-pole, differential active filter

Converting a two-pole filter of the standard form into a type with differential input and output or differential in/single out is a logical procedure.

Figure 1 is the standard, single-ended form, which converts to fully differential form by simply mirroring the circuit, as in Fig. 2, where  $C_{1,1a}$  can be combined

Since the network itself appears as a balanced bridge to common-mode signals when seen from the amplifier inputs, and since the amplifier outputs will accept common-mode voltages, an arbitrary common-mode voltage can be applied to either or both input and output pairs of terminals. This means that the balanced inputs and outputs of the Fig. 2 circuit may be balanced and single-ended respectively, as in Fig. 3.

Component values may be calculated using standard design procedure<sup>1</sup>

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**Reference**

1. For example, Chen, Carson, *Active Filter Design*.

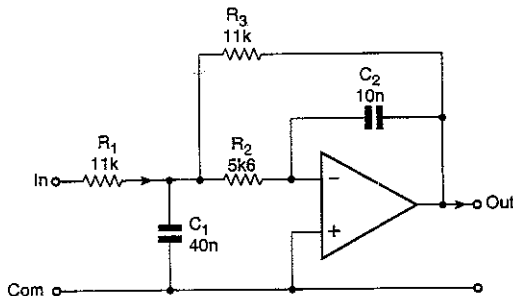


Fig.1. Standard, single-ended, two-pole active filter.

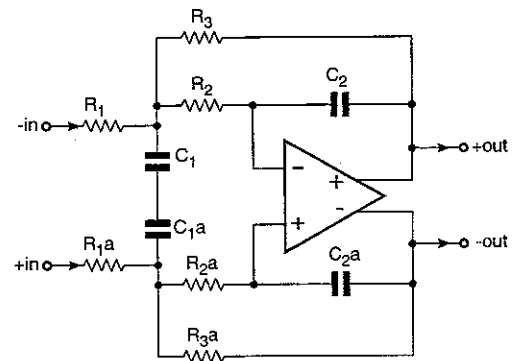


Fig.2. Fully balanced version of Fig.1 obtained by simply doubling up.

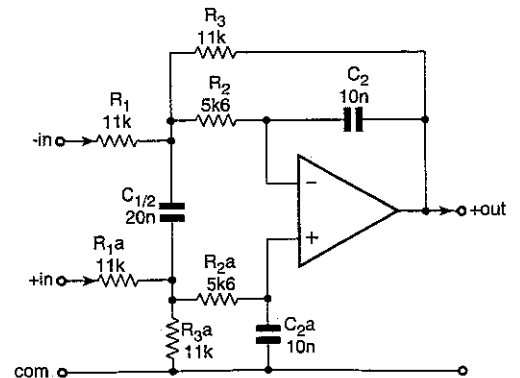


Fig.3. Differential-in/single-out allowed because of common-mode behaviour of network.