

Voltage discriminator has 0.1-mV resolution

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Positive feedback permits a dual IC comparator to perform as a high-resolution voltage discriminator that can detect either positive or negative pulses having amplitudes ranging from a few millivolts to 5 volts. When driven from such low-impedance sources as operational amplifiers, this discriminator has a linearity of better than 0.03% and a voltage resolution of about 0.1 millivolt.

The input signal is compared with the reference voltage by comparator A_1 . The signal appearing at the moment of comparison of these two voltages is taken from the common output of both comparators and fed back

to the noninverting input of comparator A.

Because of this positive-feedback path, the discriminated signal is amplified considerably, reducing the amplifier's offset voltage and improving voltage resolution. Since the feedback signal is introduced to the noninverting input of comparator A*, both inputs of comparator A_1 can be driven from low-impedance sources for better discriminator accuracy.

With capacitive feedback, as in circuit (a), the discriminator has only one stable state. With dc feedback, as in circuit (b), the discriminator becomes bistable. At the moment the input and reference signals are compared, the bistable discriminator is set to its high level. It can be reset by applying a second pulse to the inverting input of comparator A_2 . This second pulse can be applied after the first pulse has been terminated for a time that exceeds the duration of the first pulse minus the discrimination-level threshold.

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Discriminating comparators. Integrated dual comparators can differentiate between input signal height and the reference-voltage level to within 0.1 millivolt. This high resolution is due to the positive feedback from the output to the noninverting input of comparator A_2 . Capacitive feedback (a) produces a unistable discriminator, while dc feedback (b) produces a bistable one that can be reset with a second input pulse.

