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Ultra low-noise current sources

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Abstract— The solid state DC current sources available on the market are not suitable for applications in low noise measurement systems because of the high level of low-frequency noise introduced in the measurement chain. The most important cause of low-frequency noise in such instruments is the solid state device used as a voltage reference (usually a Zener diode). This problem has been solved, in the instrument described in this paper, by using a new circuit topology in which the solid-state voltage reference has been substituted by a low-noise battery. The instrument, capable of supplying a current as high as 100 mA, is characterized by a low-frequency noise level some orders of magnitude lower than that of similar commercial instrumentation.

Index Terms— Batteries, circuit noise, circuit synthesis, current supplies, dc generators, noise.

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