A Random and Pseudo-Gradient Approach for Analog Circuit Sizing with Non-Uniformly Discretized Parameters

Abstract:
Many methods for analog circuit sizing are available as commercial, in-house and academic tools. They are based on continuous optimization, e.g., of transistor geometries, although the subsequent layout step requires values on a pre-defined grid. In addition, sizing of transistors for bipolar and RF circuits frequently necessitates the use of multiples of predefined values for the design parameters. This paper presents a novel method for solving this type of discrete optimization problem. An iterative approach is presented, which is based on pseudo-gradients and a randomized calculation of search regions and steps. Experimental comparisons with simulated annealing and a continuous sizing approach with subsequent discretization clearly show the effectiveness and efficiency of the presented method.

Stichworte:
Discrete Optimization; Analog Circuits; Algorithm

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