

# Challenges in Analog/Mixed-Signal Design Automation

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The traditional view of electronic design automation has intensively focused on the design, synthesis, and layout of digital circuits. This perspective has been reinforced by the trends from Moore's law, which have seen digital system complexities grow exponentially, prompting an acute need for efficient design tools and flows. In contrast, analog design has remained largely focused on the expert designer. This world view is now changing, for several reasons. First, several tasks in analog design are now at a point where they can be realistically automated, notably tasks related to layout automation. In advanced finFET technologies, the reduction in the degrees of freedom due to restricted design rules actually makes layout automation easier. Second, the clear distinction between analog and digital designs has blurred, with modern designs seeing a great deal of digital-like circuitry that assists in implementing analog functionalities. For these structures, established techniques from digital system design can carry over to enable design automation. Third, the complexity of the mixed-signal design space makes it difficult for designers to fully comprehend and compensate for the impact of phenomena such as process variations and device aging. Especially under stringent design specifications, these complexities create openings for design automation tools that can complement the knowledge of the expert designer. Thus, analog and mixed-signal design, which has long been the bastion of the expert designer, is projected to be the new frontier in design automation. This talk will present a brief history of prior efforts and will overview the set of opportunities and challenges in this emerging field.

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