ABSTRACT

Superconducting digital circuits have been around for decades, but recent projects that exploit such circuits for low power, high performance computing are rapidly maturing superconducting circuit technologies. As a result of increasing circuit complexity, there is renewed focus on superconducting digital circuit design tools. Until now, most CAD tool development for SCE circuit design has been based on calibrating semiconductor tools, rather than creating new technology-specific tools for SCE circuit design. The recent development shows bias towards large and expensive CAD tools. These tools, or modules developed for commercial semiconductor CAD tools, require users to have access to expensive commercial semiconductor CAD software, which places it out of the reach of new entrants or small research groups in SCE. In this paper, the open source tools that can be used as alternatives to form a SCE design tool chain, are described. All the design stages in a superconducting electronics integrated circuits design flow, from circuit specification down to layout design are noted in the paper. Each stage is discussed and the available open source tools are described. The inherent disadvantages of these open source tools are also pointed out. A design example is then provided to demonstrate a complete open source and freeware toolchain.