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Inductance extraction of superconductor structures with internal current sources

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Abstract

© 2015 IOP Publishing Ltd. The sheet current model underlying the 3D-MLSI software package for calculation of inductances of multilayer superconducting circuits has been further elaborated. The developed approach permits us to overcome serious limitations on the shape of the circuit layout and opens the way for simulation of internal contacts or vias between layers. Two models for internal contacts have been considered. They are a hole as a current terminal and a distributed current source. Advantages of the developed approach are illustrated by calculating the spatial distribution of the superconducting current in several typical layouts of superconducting circuits. A new meshing procedure now permits us to implement triangulation for joint projection of all nets, thus improving the discrete physical model for inductance calculations of circuits made in both planarized and non-planarized fabrication processes. To speed up triangulation and build a mesh of better quality, we adopt the known program Triangle.

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Keywords

Current source, Inductance extraction, London equation, FEM