Performance Advantages and Design Issues of SQIFs for Microwave Applications

Victor K. Kornev, Igor I. Soloviev, Nikolai V. Klenov,
Timur V. Filippov, Henrik Engseth, and Oleg A. Mukhanov, Senior Member, IEEE

Abstract—We consider applications of SQIFs as amplifiers for gigahertz frequency range. SQIF-like structures are able to provide much higher dynamic range and linearity than a dc SQUID. We also analyze design limitations imposed by finite coupling inductances and stray capacitances. Possible ways of resolving design issues are discussed.

Index Terms— Josephson junctions, SQUID, SQIF, amplifiers, voltage response, high linearity, dynamic range.

Manuscript received 19 August 2008.
This work was supported by ONR under grant RUP1-1493-05-MO via CRDF GAP and in part by ISTC grant 3743 and Russian grants on scientific schools PGSS 5408.2008.2 and PGSS 133.2008.2.
V. K. Kornev, I. I. Soloviev, N. V. Klenov and T. V. Filippov are with Moscow State University, Moscow 119991, Russia. (phone: 7-495-939-4351, fax: 7-495-939-3000, e-mail: kornev@phys.msu.ru).
H. Engseth and O. A. Mukhanov are with the HYPRES, 175 Clearbrook Road, Elmsford, NY 10523, USA (e-mail: mukhanov@hypres.com).