Abstracts

Simulation of the Superconducting Quasiparticle Mixer Using a Five-Port Model

A harmonic Newton technique has successfully been used in the simulation of superconducting quasiparticle mixers in a five-port model. The steady-state large-signal waveform impressed across the tunnel junction by the incident local oscillator (LO) power is computed in the frequency domain. The three-frequency approximation provides the initial trial solution, which, together with the superlinear convergence property of Newton's method, ensures rapid convergence. A wide range of simulations based on the response function of a real superconductor insulator-superconductor (SIS) junction is presented. The case of an SIS harmonic mixer (n = 2) has also been studied. The first results indicate that harmonic quasiparticle mixing may be very attractive in the submillimeter-wave band.

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