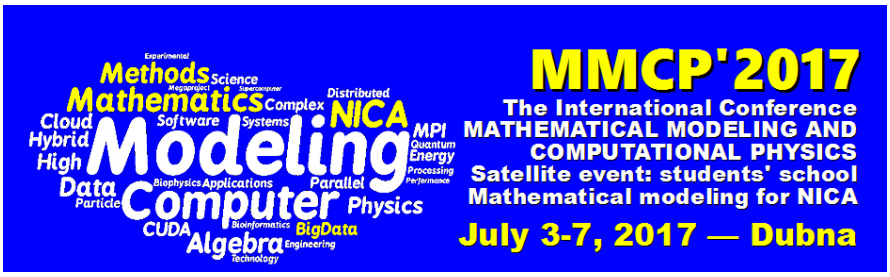

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IVC Calculation Problem for Josephson Junction Stacks. On Asymptotic Construction near the Breakpoint .

Thursday 6 July 2017 13:30 (15 minutes)

A detailed investigation of the IVC breakpoint and the breakpoint region width gives important information [1],[2] concerning the peculiarities of stacks with a finite number of intrinsic Josephson junctions. In [3] IVC for a stack of n Josephson junctions is defined numerically using the fourth- order Runge-
Kutta method. The current voltage characteristic has the shape of a Hysteresis loop. On the back branch of the Hysteresis loop, near the breakpoint I_b, voltage V(I) decreases to zero rapidly. In addition, in numerical modelling (non-periodic boundary condition) IVC branching is observed near I_b. It is interesting to study this phenomenon analytically developing asymptotic methods. A numerical-analytical method was proposed in [4]. The general scheme of suggested numerical-analytical method of the hysteresis loop calculation is following: the right branch of the hysteresis loop and the back branch (not nearing some finite distance to I_b)
are calculated using the "asymptotic" formulas. The rest points (I; V(I)) of the hysteresis loop are calculated numerically using the fourth- order Runge-Kutta method. This method showed good results in IVC branching calculation in particular. I succeeded to calculate analytically the whole hysteresis loop in the case of periodic boundary conditions. The approximate solution at the breakpoint region had been developed using the Bogolyubov-Krylov method [5].

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