



ЛАБОРАТОРИЯ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ

СЕМИНАР ПО ГЕТЕРОГЕННЫМ ВЫЧИСЛЕНИЯМ



Четверг, 26 мая 2016 г. в 11.00

ком. 310

Ivan Hristov, Radoslava Hristova
Sofia University, Bulgaria / LIT, JINR

Stefka Dimova
Sofia University, Bulgaria

Hybrid MPI+OpenMP parallelization of a leapfrog algorithm for solving systems of 2D Sine-Gordon equations

The numerical solving of systems of 2D Sine-Gordon equations is important both for pure mathematical theory and for applications. A leapfrog algorithm is proposed for solving particular systems of 2D perturbed Sine-Gordon equations coupled via a cyclic tridiagonal matrix.

In some cases the computational domain size and the number of time steps may be very large, which motivates a parallelization of the algorithm. The algorithm is parallelized by a fully hybrid strategy: one MPI process per cluster node and OpenMP on the cores of the node. For different performance tests we use the computational resources of the HybriLIT cluster and the ICT-BAS cluster. Nice performance scalability is achieved.

As a simulation example, the standing wave solutions corresponding to the cavity resonances in BSCCO Intrinsic Josephson Junctions are shown.