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Nonlinear wave simulation on the Xeon Phi Knights Landing Processor

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A finite difference scheme for solving systems of 2D Sine-Gordon equations is constructed. A parallelization strategy with both thread and SIMD levels of parallelism is proposed and an OpenMP program is realized. The program is tested on two different Intel architectures: 2x Xeon E5-2695 v2 processors, (code-named “Ivy Bridge-EP”) in the Hybrilit cluster and on Xeon Phi 7250 processor (code-named “Knights Landing”(KNL)). As a result we achieve good performance scalability on both architectures and better performance on KNL processor. A numerical example of a standing nonlinear wave is given.

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