

Arithmetic Intensity Measurement in SpMV and SpMM

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Abstract

Sparse matrix-vector multiplication (SpMV) is a widely applied operation in diverse areas of science and engineering. A generalization of this operation is the sparse matrix-multiple vectors multiplication (SpMM), in which the sparse matrix is now multiplied by a dense matrix. This work explores the implications between execution time and data movement that take place in these types of operations. Taking into account that moving data between each level in the memory hierarchy is much more expensive than processing the data. Metrics are established for the evaluation of the performance attained in SpMV and SpMM routines and the results obtained with the configuration settings are compared. The matrices used in the experiments come from relevant study cases. Evaluation results show that SpMM outperforms SpMV when the largest cache size in the system is sufficiently large to hold all operands involved in the computation.

Keywords: SpMV, SpMM, CPU computing.

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