Numerical Linear Algebra: Class Project Mar 22

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1 IMPLEMENTATION

I chose $n_r = m_r = 4$ based on the length of the vector values we were using. I then implemented a rank-1 update for length 4 vectors by using a butterfly permute executed with Intel intrinsic functions. (using ICC as my compiler) This update was executed in a loop that executes k_c times, each time adding the results of the rank-1 update to the matrix calculated so far.

I found this gave approximate a 4-fold increase in performance over the naïve C implementation, and about $\frac{1}{6}$ of the performance of the reference implementation ($\frac{1}{8}$ of peak.) Experimenting with changing the values of the DGEMM constants (other than n_r and m_r) did not seem to have any effect on performance.
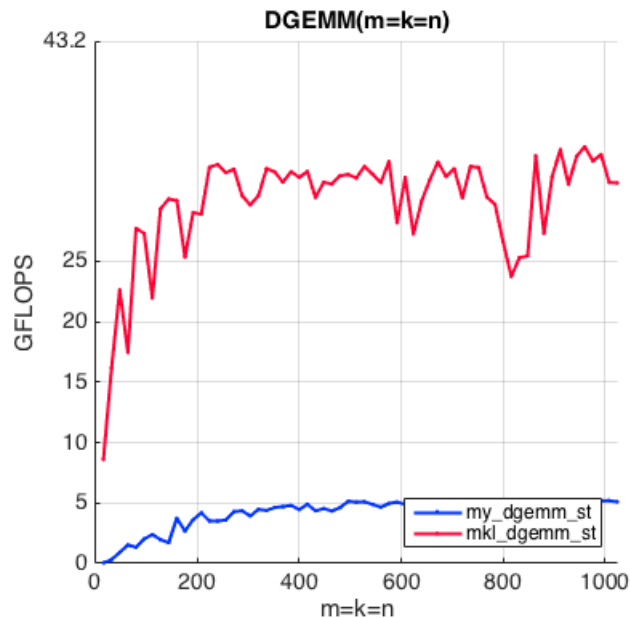
2 PERFORMANCE GRAPH

Figure 2.1: Single-threaded perfornance of `my_dgemm` against the reference implementation.