

result

<使用したPC>

MacBook Air(Mid 2013)

プロセッサ 1.3GHz デュアルコアIntel Core i5

メモリ 4GB 1600MHz DDR3

<実行結果>

・パターン1

matrix size = 256 x 256

[Normal] elapsed time = 0.16217 [sec]

matrix size = 512 x 512

[Normal] elapsed time = 2.34068 [sec]

matrix size = 1024 x 1024

[Normal] elapsed time = 32.41904 [sec]

matrix size = 2048 x 2048

[Normal] elapsed time = 245.65241 [sec]

・パターン2

matrix size = 256 x 256

[AVX] elapsed time = 0.05674 [sec]

matrix size = 512 x 512

[AVX] elapsed time = 0.59500 [sec]

matrix size = 1024 x 1024

[AVX] elapsed time = 9.41452 [sec]

matrix size = 2048 x 2048

[AVX] elapsed time = 85.62580 [sec]

・パターン3

matrix size = 256 x 256

[AVX+LU] elapsed time = 0.06663 [sec]

matrix size = 512 x 512

[AVX+LU] elapsed time = 0.69835 [sec]

matrix size = 1024 x 1024

[AVX+LU] elapsed time = 7.45124 [sec]

matrix size = 2048 x 2048

[AVX+LU] elapsed time = 71.16666 [sec]

・パターン4

matrix size = 256 x 256

[AVX+LU+CB] elapsed time = 0.11156 [sec]

matrix size = 512 x 512

[AVX+LU+CB] elapsed time = 0.86375 [sec]

matrix size = 1024 x 1024

[AVX+LU+CB] elapsed time = 6.93581 [sec]

matrix size = 2048 x 2048

[AVX+LU+CB] elapsed time = 65.29176 [sec]

・パターン5

matrix size = 256 x 256

[AVX+LU+CB+OMP] elapsed time = 0.05194 [sec]

matrix size = 512 x 512

[AVX+LU+CB+OMP] elapsed time = 0.42860 [sec]

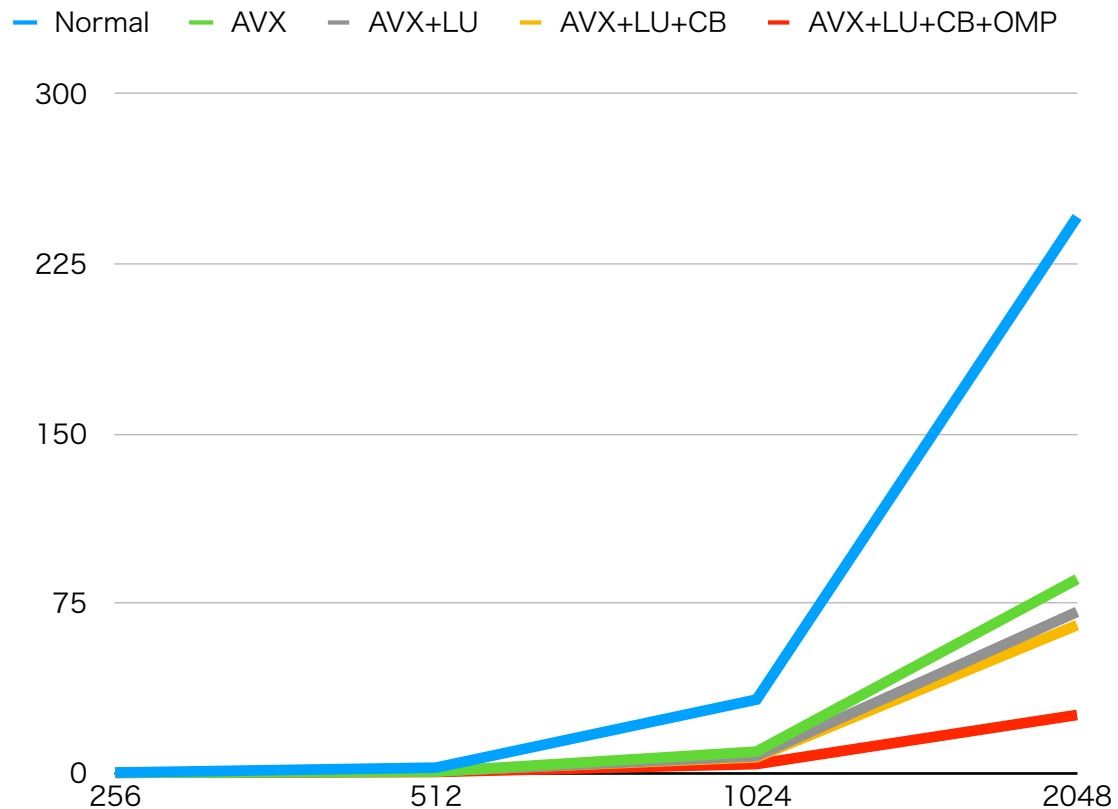
matrix size = 1024 x 1024

[AVX+LU+CB+OMP] elapsed time = 3.91702 [sec]

matrix size = 2048 x 2048

[AVX+LU+CB+OMP] elapsed time = 25.62289 [sec]

<グラフ>



<考察>

結果, グラフから分かるように, パターン1のノーマル実行が一番遅く, パターン5のAVX を利用し, ループ展開とブロック化した上で OpenMP による並列化した実行が一番はやいことが分かる.

M1Macではパターン1とパターン4が実行できた.

matrix size = 256 x 256

[Normal] elapsed time = 0.08719 [sec]

[AVX+LU+CB] elapsed time = 0.09405 [sec]

matrix size = 512 x 512

[Normal] elapsed time = 0.50684 [sec]

[AVX+LU+CB] elapsed time = 0.48133 [sec]

matrix size = 1024 x 1024

[Normal] elapsed time = 4.59683 [sec]

[AVX+LU+CB] elapsed time = 3.65536 [sec]

matrix size = 2048 x 2048

[Normal] elapsed time = 64.37561 [sec]

[AVX+LU+CB] elapsed time = 29.28668 [sec]