BAB VI

KESIMPULAN DAN SARAN

6.1 Kesimpulan

Penelitian ini bertujuan untuk memecahkan persamaan model Heston menggunakan solusi numerikal metode *finite difference non-uniform grids* berbasis paralel *programming Compute Unified Device Architecture* (CUDA) untuk mendapatkan hasil yang akurat dan cepat. Berdasarkan penelitian metode *finite difference non-uniform grids* dengan algoritma GPU dapat menghasilkan nilai yang mendekati nilai eksak dan semakin akurat saat *grids* diperbesar.

Margin *error* pada hasil eksperimen terus menurun setiap N_s ditingkatkan 10 titik, dan N_v ditingkatkan 5 titik. Hasil solusi numerik *finite difference non-uniform grids* dengan kombinasi maksimum *grids* $N_s = 190$ dan $N_v = 75$ menghasilkan nilai 4.2805 dengan margin *error* 0.0018, berbanding nilai kombinasi insial *grids* $N_s = 80$ dan $N_v = 20$ menghasilkan nilai 4.2760 dengan margin *error* -0.0023. Pada eksperimen kestabilan dengan kombinasi *grids* $N_s = 190$ dan $N_v = 150$, margin *error* yang didapatkan semakin kecil yaitu 0.0016. Hal tersebut membuktikan bahwa meningkatkan jumlah titik *grids* akan meningkatkan akurasi.

Pembesaran grids juga berjalan dengan lebih cepat saat diproses dengan GPU. Proses komputasi lebih cepat 1.38X pada kombinasi insial *grids* $N_s = 80$ dan $N_v = 20$ dan terus meningkat hingga memiliki percepatan 12.04X lebih cepat pada *grids* $N_s = 190$ dan $N_v = 75$. Pada eksperimen kestabilan dengan kombinasi *grids*

$N_s = 190$ dan $N_v = 150$ performa komputasi mencapai 15.52X lebih cepat. Semakin besar *grids*, performa performa GPU semakin cepat namun tetap stabil. Sehingga dapat disimpulkan GPU memiliki performa yang lebih cepat dan akurat dengan jumlah *grids* yang lebih besar.

6.2 Saran

Penelitian selanjutnya dapat melakukan modifikasi solusi numerik *finite difference non-uniform grids* supaya lebih stabil saat dilakukan perbesaran *grids*. Hal lain yang dapat dilakukan dalam penelitian selanjutnya adalah mengimplementasi konsep *shared* memori untuk mempercepat proses komputasi serta mengatur *block threads*.

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