Расчетная область из 5120 треугольников

Реализация с хранением координат в отдельных массивах

Реализация с хранением координат в массиве структур

Сводные диаграммы

512 нитей на блок

32 нити на блок

Использовался формат хранения с помощью структур

Количество точек = 1024

Пример результат выполнения программы:

Laplace solver with vector3s

Points count: 32

Triangles count: 5120

Quadrature order: 64

Preparing quadratures: 5.560000e-03

Solving on CPU: 1.200420e-01

Copying to device: 1.074100e-01

Solving on GPU: 8.195872e-03

Getting results from GPU: 6.900000e-05

Total for GPU: 1.156749e-01

GPU speedup: 1.464664e+01

Total time: 2.412769e-01

----------------CPU results:---------------

i pointx pointy pointz true calc error

0 1.250000e-02 2.000000e-01 0.000000e+00 -0.039688 -0.039688 3.286960e-13

1 2.500000e-02 2.000000e-01 0.000000e+00 -0.038750 -0.038750 3.550923e-13

2 3.750000e-02 2.000000e-01 0.000000e+00 -0.037188 -0.037188 4.080769e-13

3 5.000000e-02 2.000000e-01 0.000000e+00 -0.035000 -0.035000 4.036454e-13

4 6.250000e-02 2.000000e-01 0.000000e+00 -0.032188 -0.032188 4.675871e-13

5 7.500000e-02 2.000000e-01 0.000000e+00 -0.028750 -0.028750 5.081684e-13

6 8.750000e-02 2.000000e-01 0.000000e+00 -0.024688 -0.024688 6.541884e-13

7 1.000000e-01 2.000000e-01 0.000000e+00 -0.020000 -0.020000 8.142792e-13

8 1.125000e-01 2.000000e-01 0.000000e+00 -0.014688 -0.014688 1.032271e-12

9 1.250000e-01 2.000000e-01 0.000000e+00 -0.008750 -0.008750 1.807681e-12

10 1.375000e-01 2.000000e-01 0.000000e+00 -0.002188 -0.002188 7.335997e-12

11 1.500000e-01 2.000000e-01 0.000000e+00 0.005000 0.005000 3.392946e-12

12 1.625000e-01 2.000000e-01 0.000000e+00 0.012812 0.012812 1.342287e-12

13 1.750000e-01 2.000000e-01 0.000000e+00 0.021250 0.021250 8.207487e-13

14 1.875000e-01 2.000000e-01 0.000000e+00 0.030312 0.030312 5.641535e-13

15 2.000000e-01 2.000000e-01 0.000000e+00 0.040000 0.040000 4.206704e-13

16 2.125000e-01 2.000000e-01 0.000000e+00 0.050313 0.050312 3.505822e-13

17 2.250000e-01 2.000000e-01 0.000000e+00 0.061250 0.061250 2.776690e-13

18 2.375000e-01 2.000000e-01 0.000000e+00 0.072813 0.072812 2.298591e-13

19 2.500000e-01 2.000000e-01 0.000000e+00 0.085000 0.085000 1.941258e-13

20 2.625000e-01 2.000000e-01 0.000000e+00 0.097812 0.097812 1.708254e-13

21 2.750000e-01 2.000000e-01 0.000000e+00 0.111250 0.111250 1.490693e-13

22 2.875000e-01 2.000000e-01 0.000000e+00 0.125313 0.125312 1.295722e-13

23 3.000000e-01 2.000000e-01 0.000000e+00 0.140000 0.140000 1.100310e-13

24 3.125000e-01 2.000000e-01 0.000000e+00 0.155312 0.155312 1.016848e-13

25 3.250000e-01 2.000000e-01 0.000000e+00 0.171250 0.171250 8.395555e-14

26 3.375000e-01 2.000000e-01 0.000000e+00 0.187813 0.187812 7.699517e-14

27 3.500000e-01 2.000000e-01 0.000000e+00 0.205000 0.205000 6.282238e-14

28 3.625000e-01 2.000000e-01 0.000000e+00 0.222813 0.222812 6.004236e-14

29 3.750000e-01 2.000000e-01 0.000000e+00 0.241250 0.241250 5.338274e-14

30 3.875000e-01 2.000000e-01 0.000000e+00 0.260313 0.260312 3.945090e-14

31 4.000000e-01 2.000000e-01 0.000000e+00 0.280000 0.280000 3.568574e-14

----------------GPU results:---------------

i pointx pointy pointz true calc error

0 1.250000e-02 2.000000e-01 0.000000e+00 -0.039688 -0.039688 3.349901e-13

1 2.500000e-02 2.000000e-01 0.000000e+00 -0.038750 -0.038750 3.534807e-13

2 3.750000e-02 2.000000e-01 0.000000e+00 -0.037188 -0.037188 3.793417e-13

3 5.000000e-02 2.000000e-01 0.000000e+00 -0.035000 -0.035000 4.137563e-13

4 6.250000e-02 2.000000e-01 0.000000e+00 -0.032188 -0.032188 4.617665e-13

5 7.500000e-02 2.000000e-01 0.000000e+00 -0.028750 -0.028750 5.290454e-13

6 8.750000e-02 2.000000e-01 0.000000e+00 -0.024688 -0.024688 6.286111e-13

7 1.000000e-01 2.000000e-01 0.000000e+00 -0.020000 -0.020000 7.927686e-13

8 1.125000e-01 2.000000e-01 0.000000e+00 -0.014688 -0.014688 1.095459e-12

9 1.250000e-01 2.000000e-01 0.000000e+00 -0.008750 -0.008750 1.870726e-12

10 1.375000e-01 2.000000e-01 0.000000e+00 -0.002188 -0.002188 7.584211e-12

11 1.500000e-01 2.000000e-01 0.000000e+00 0.005000 0.005000 3.356170e-12

12 1.625000e-01 2.000000e-01 0.000000e+00 0.012812 0.012812 1.325633e-12

13 1.750000e-01 2.000000e-01 0.000000e+00 0.021250 0.021250 8.024627e-13

14 1.875000e-01 2.000000e-01 0.000000e+00 0.030312 0.030312 5.670149e-13

15 2.000000e-01 2.000000e-01 0.000000e+00 0.040000 0.040000 4.312523e-13

16 2.125000e-01 2.000000e-01 0.000000e+00 0.050313 0.050312 3.428589e-13

17 2.250000e-01 2.000000e-01 0.000000e+00 0.061250 0.061250 2.820873e-13

18 2.375000e-01 2.000000e-01 0.000000e+00 0.072813 0.072812 2.348146e-13

19 2.500000e-01 2.000000e-01 0.000000e+00 0.085000 0.085000 2.003299e-13

20 2.625000e-01 2.000000e-01 0.000000e+00 0.097812 0.097812 1.721023e-13

21 2.750000e-01 2.000000e-01 0.000000e+00 0.111250 0.111250 1.491940e-13

22 2.875000e-01 2.000000e-01 0.000000e+00 0.125313 0.125312 1.300151e-13

23 3.000000e-01 2.000000e-01 0.000000e+00 0.140000 0.140000 1.137979e-13

24 3.125000e-01 2.000000e-01 0.000000e+00 0.155312 0.155312 9.971903e-14

25 3.250000e-01 2.000000e-01 0.000000e+00 0.171250 0.171250 8.735915e-14

26 3.375000e-01 2.000000e-01 0.000000e+00 0.187813 0.187812 7.640403e-14

27 3.500000e-01 2.000000e-01 0.000000e+00 0.205000 0.205000 6.674877e-14

28 3.625000e-01 2.000000e-01 0.000000e+00 0.222813 0.222812 5.767554e-14

29 3.750000e-01 2.000000e-01 0.000000e+00 0.241250 0.241250 4.970118e-14

30 3.875000e-01 2.000000e-01 0.000000e+00 0.260313 0.260312 4.243638e-14

31 4.000000e-01 2.000000e-01 0.000000e+00 0.280000 0.280000 3.509098e-14