Case for validation GPU time

Red: fixed

Green: Changeable

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Code method | Two particles in one cell | Big packing calculation  Two particles | One particle in one cell | Big packing calculation  One particle |
| Physics models | Damping |  | Damping | Damping |
| Cell size (m) | 0.10  0.08 |  | 0.05 | 0.05 |
| Cell number | 50\*50\*50  100\*100\*100  125\*125\*125 | 750\*750\*50 | 200\*200\*200  100\*100\*100 | 1500\*1500\*100 |
| Particle size (m)  diameter | 0.10 |  | 0.10 | 0.10 |
| Particle number per layer | 94\*94\*94 |  | 94\*94\*94 | 94\*94\*94 |
| Calculation time steps | 40 000 |  | 40 000 | 40 000 |
| Total packing size(m\*m\*m) | 10 \*10 \*10 |  | 10 \*10 \*10 | 10 \*10 \*10 |
| Particle dropping characters | Same velocity + same number of particles |  | Same velocity + same number of particles | Same velocity + same number of particles |
| kn(N/m) | 6 000 000 |  | 6 000 000 | 6 000 000 |
| Restitution coefficient | 0.5 |  | 0.5 | 0.5 |
| Density(kg/m3) | 2700 |  | 2700 | 2700 |
| GPU time(s)  with RTX A4500 |  |  |  |  |

1. Two particles in one cell (100\*100\*100)

|  |  |  |
| --- | --- | --- |
| Test number | Calculation time steps | GPU time(s) with RTX A4500 |
| 1 | 20 | 19.3178584 |
| 2 | 40 |  |
| 3 | 200 |  |
| 4 | 400 |  |
| 5 | 2000 |  |
| 6 | 4000 | 3597.8665940761566 |
| 7 | 20000 | 18270.414857149124 |

1. One particles in one cell (200\*200\*200)

|  |  |  |
| --- | --- | --- |
| Test number | Calculation time steps | GPU time(s) with RTX A4500 |
| 1 | 20 | 52.1558961 |
| 2 | 40 | 103.14774036 |
| 3 | 200 | 517.08485293388 |
| 4 | 400 |  |
| 5 | 2000 |  |
| 6 | 4000 |  |
| 7 | 20000 | 51072.68960213661 |

1. One particles in one cell (100\*100\*100)

|  |  |  |
| --- | --- | --- |
| Test number | Calculation time steps | GPU time(s) with RTX A4500 |
| 1 | 20 |  |
| 2 | 40 |  |
| 3 | 200 |  |
| 4 | 400 |  |
| 5 | 2000 |  |
| 6 | 4000 |  |
| 7 | 20000 |  |

1. One particles in one cell (50\*50\*50)

|  |  |  |
| --- | --- | --- |
| Test number | Calculation time steps | GPU time(s) with RTX A4500 |
| 1 | 20 |  |
| 2 | 40 |  |
| 3 | 200 |  |
| 4 | 400 |  |
| 5 | 2000 |  |
| 6 | 4000 |  |
| 7 | 20000 |  |