scSTREAM

Cradle
MSC Software Company

DEM - Discrete Element Method

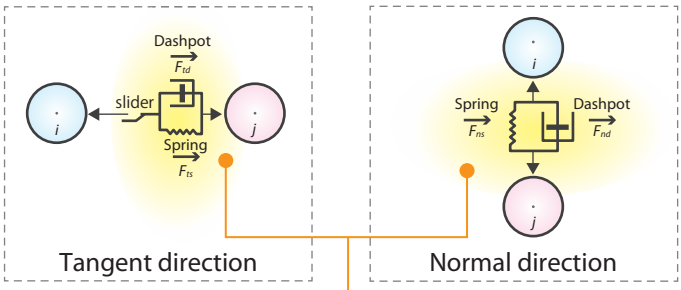
scSTREAM Function

CFDEM

Performing coupling analysis of solid particles and fluids

What is DEM?

- Abbreviated for Discrete Element Method. Generally known as DEM. A method to calculate motion of a large number of small particles, which accounts for collision and repulsion force between solid particles.
- The biggest advantage conventional particle tracking function does not have is that DEM accounts for contact force particles have on each other.
- DEM function of scSTREAM enables coupling of fluid analysis with the interactions among solid particles.



Contact force is modeled by Voigt model. The given value of repulsion is proportional to spring constants acting in normal and tangent directions (two components).

Interactive force acting on particles

- Contact force
- Van der Waals force
- Lubrication force

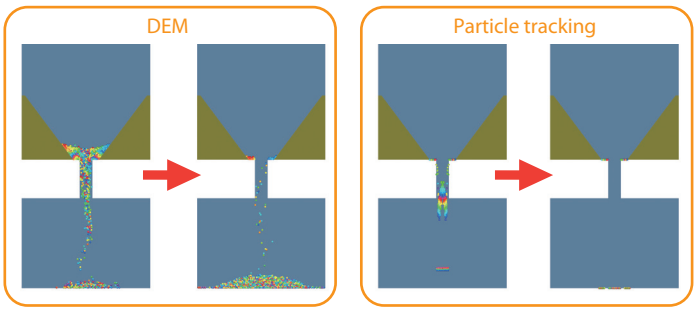
Analysis examples

Sand and gravel

Screw transportation

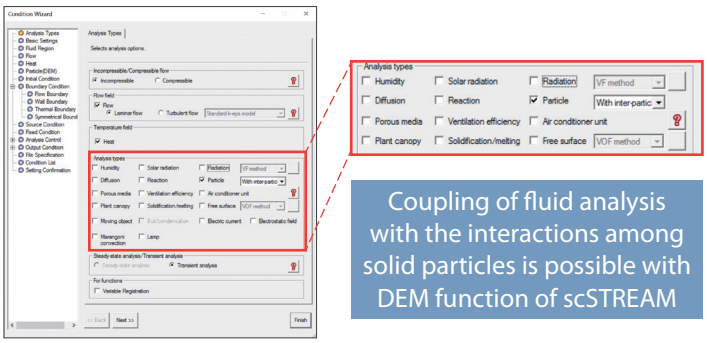
Mixer

Difference between DEM and particle tracking



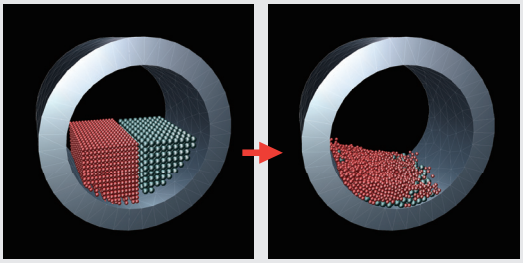
The analysis of an hourglass above shows results of DEM on left and particle tracking on right. On right, sand does not accumulate as particle tracking does not account for contact force between particles. On left, sand accumulation is simulated as DEM accounts for contact force.

Setting



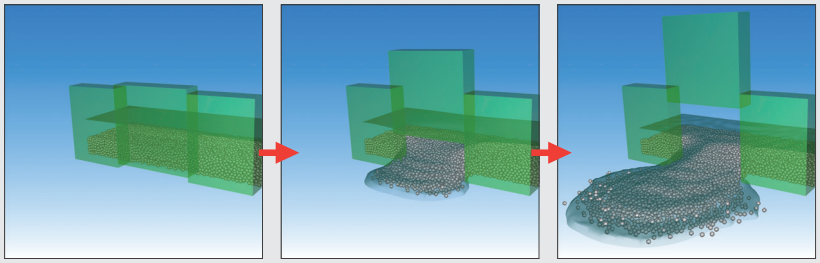
Coupling of fluid analysis with the interactions among solid particles is possible with DEM function of scSTREAM

Application example



Analysis of ball mill

The analysis results show particle behavior when mixing 4000 units of two types of particles in varied sizes.



Analysis of sand and gravel

Results illustrate how the accumulated sand and gravel flow out of the released dam. Moving object function is used to simulate the motion of dam gate lifted upward.

Notes

Accumulation of solid particles, which are often seen in various phenomena, can be simulated using DEM.