Particle Simulation - Related Equations

1. Collision Detection:
   The distance between two particles is computed:
   Distance = ||r_i - r_j||
   where r_i and r_j are the positions of particles i and j.

2. Velocity Update After Collision:
   The velocity along the collision direction is calculated:
   v_along_normal = dot(v_i - v_j, normal)
   where v_i and v_j are velocities of the particles,
   and normal is the unit vector along the collision direction.
   After the collision, the velocity is updated as:
   v_i' = v_i - impulse * normal
   v_j' = v_j + impulse * normal

3. Gravity Effect:
   Gravity accelerates particles in the y-direction:
   v_y = v_y - g * dt

4. Damping Effect:
   After a collision, the velocities are reduced by a damping factor:
   v_i = v_i * damping_factor
   v_j = v_j * damping_factor