**Physical-based Motion Control**

**Introduction:**

The animation is in 3D space with 10 teapot falling on the ground, and each teapot will collide with each other during the process. A video can be found under.

<https://www.youtube.com/watch?v=F8cHxy37eAA&feature=youtu.be>

**Key implementation:**

This animation is implemented with GLUT along with a math library GLM, which allows me to use normalization without myself to implement it. Also GLUT itself allows me to draw model on the screen without import it. I finally choose the teapot cause it was the first computer graphic ever made. I set the acceleration to -9.8 to make it more realistic and collision coefficient to 0.8, which means velocity would reduce 0.8 times of original velocity.

**Interpolation flow:**

First, we need to draw 10 teapots on the screen, then we set initial velocity, delta time, acceleration, and collision coefficient.

Second, we need to do collision detection. Each time collision detected, the velocity will reduce to 0.8 times original velocity.

Third, we have a 4x4 matrix for each ball, pass it to glMultiMatrixf() to draw them on the screen.