TEST 3

This unit test aims to decouple the phase-field evolution equation from the temperature equation and test if the phase-field equation evolves correctly in an anisotropic setting. The phase-field is initialized to a circle and allowed to evolve to see whether desired anisotropic shape is attained. This basic aim can be summarized as:

1. Check whether inputs are read correctly by checking input.in and the corresponding output.in in the output folder.
2. Check if the Filling Algorithms are working correctly such as Fill_Sphere and Fill_Constant.
3. Plot the output phi.vtk files in paraview to see phase-field profile varies smoothly over time.
4. The phase-field profiles should shrink with time maintaining a cuboidal shape (because of the presence of four-fold anisotropy) and ultimately dissolve (driving force is switched-off).
5. The temperature field should not evolve over time since it is initialized to a constant value.

The test3_input.in contains the keys to run and implement the unit test. Some important points that warrants attention are as follows:
1. To switch off the driving force terms in the phase-field equation select

gamma = 0.0;
alpha = 0.0;

2. Switch-off the noise term by setting **a = 0.0;**
3. Switch-on the anisotropy term by setting **delta = 0.05** and **j = 4;**
4. Switch-off the coupling term in temperature equation by setting **K = 0.0;**
5. Fill a circular domain at the center of the simulation domain by assigning a value of phi = 1 to this region by

Fill_Sphere = phi,1.0,20,50,50;

6. Fill the entire domain by a constant value of temp field as

Fill_Constant = temp,0.0;

7. Additionally, set **T_e = 0.0** (or the same constant value set in Fill_Constant).
8. Rest of the keys can be found in the input file.

The plots are presented in the output folder, where the solution passes the tests 1-5 stated above.