```
 1 # Mesh Generation:
 2 rmin, rmax, ref_level, nlayers  = 1.22, 2.22, 4, 16
 3 mesh2d = CubedSphereMesh(rmin, refinement_level=ref_level, degree=2)
 4 mesh = ExtrudedMesh(mesh2d, layers=nlayers, extrusion_type='radial')
 5
 6 ----------------------------------------------------------------------------------------------------
 7 # Nullspaces and near-nullspaces:
 8 x_rotV = Function(V).interpolate(as_vector((0, X[2], -X[1])))
 9 y_rotV = Function(V).interpolate(as_vector((-X[2], 0, X[0])))
10 z_rotV = Function(V).interpolate(as_vector((-X[1], X[0], 0)))
11 V_nullspace = VectorSpaceBasis([x_rotV, y_rotV, z_rotV])
12 V_nullspace.orthonormalize()
13 p_nullspace = VectorSpaceBasis(constant=True) # Constant nullspace for pressure
14 Z_nullspace = MixedVectorSpaceBasis(Z, [V_nullspace, p_nullspace]) # Setting mixed nullspace
15
16 nns_x = Function(V).interpolate(Constant([1., 0., 0.]))
17 nns_y = Function(V).interpolate(Constant([0., 1., 0.]))
18 nns_z = Function(V).interpolate(Constant([0., 0., 1.]))
19 V_near_nullspace = VectorSpaceBasis([nns_x, nns_y, nns_z, x_rotV, y_rotV, z_rotV])
20 V_near_nullspace.orthonormalize()
21 Z_near_nullspace = MixedVectorSpaceBasis(Z, [V_near_nullspace, Z.sub(1)])
```

Figure 6. Difference in Firedrake code required to create a 3-D spherical shell based on a cube-sphere. The case of Figure 5 is extended to three dimensions by the inclusion of extra ...