Testing the cohesive formulation with a K-field BC

Properties for the bulk

These properties reflect aluminum

In[4]:=
```
ElasticModulus = 1.96 * 10^11;
PoissonsRatio = 0.3;
PlaneStrainModulus = ElasticModulus / (1 - PoissonsRatio^2);
```

Properties for the cohesive zone

These properties are representative of a metal with a relatively low fracture energy. The prescribed fracture energy is 1000 J/m^2. Because the strength is mediumish, 500 MPa, the cohesive zone size was chosen to live in the fine part of the mesh.

In[7]:=
```
sigmaC = 500 * 10^6;
deltaC = 4 * 10^-6;
cohesiveEnergy = (1 / 2) * sigmaC * deltaC
```

Out[9]= 1000

Stress intensity at crack extension

When K_{applied} = K_{critical}, the crack will propagate. The will be revealed as the cohesvie zone translating in the calculation. The first part of the process is cohesive zone formation. After the cohesive zone forms, the cohesive zone will translate. In this case, that should happen right before 15 MPa*sqrt(m). The goal is to observe that in the calculation. Because time is conincident with MPa*sqrt(m), the cohesive zone should translate right before 15 s. With very small time steps and a nice discretization, this should happen at 14.7 s. It does.

In[10]:=
```
Jcritical = cohesiveEnergy;
Kcritical = Sqrt[Jcritical * PlaneStrainModulus]
```

Out[11]= 1.4676×10^{7}