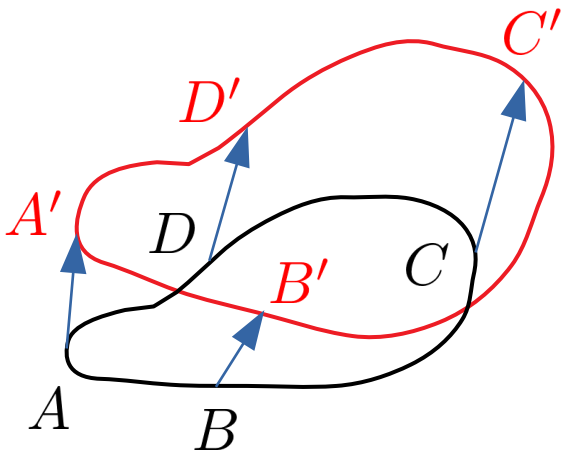
# ME231: Solid Mechanics-I

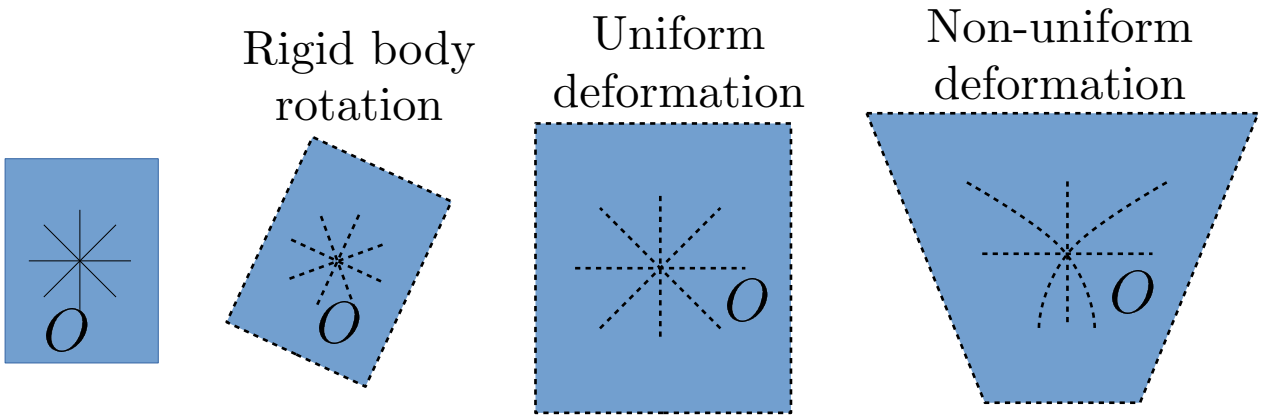
# Stress and Strain

# Deformation




Displacement of a continuous body may consist of,

- Rigid body displacement
- Rigid body rotation
- Relative displacements between points (deformation)




For negligible area surrounding point $O$, deformation can be assumed to be uniform even if overall deformation is non-uniform.

- The displacements associated with rigid-body motion can be either large or small, while the displacements associated with deformation usually are small.
- The description and analysis of rigid-body motion is important in dynamics where the forces required to produce different time rates of rigid-body motion are of interest.
- The description and analysis of deformation is important in our present study of the mechanics of deformable bodies where the forces required to produce different distortions are of interest.
- To start with, we focus our attention on a body whose particles all lie in the same plane and which deforms only in this plane. This type of deformation is called **plane strain.**