



ABAQUS

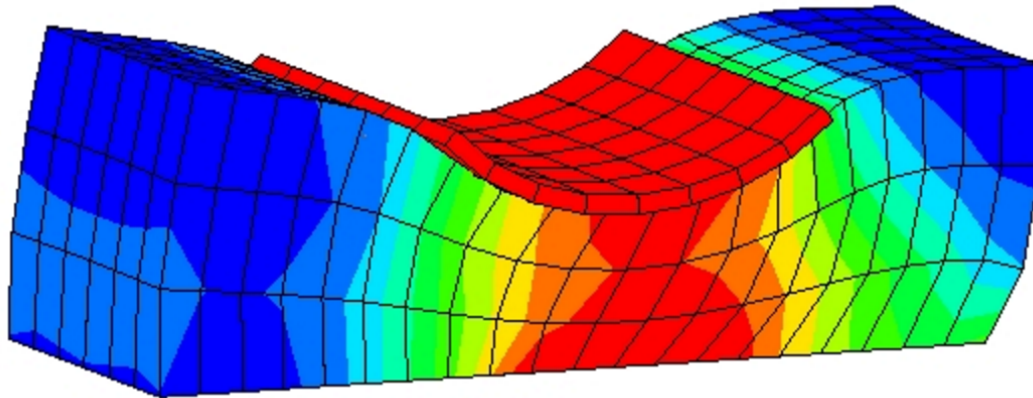
ME 498CA1 Fall 2016

Contact & Fracture Modeling

ABAQUS Contact

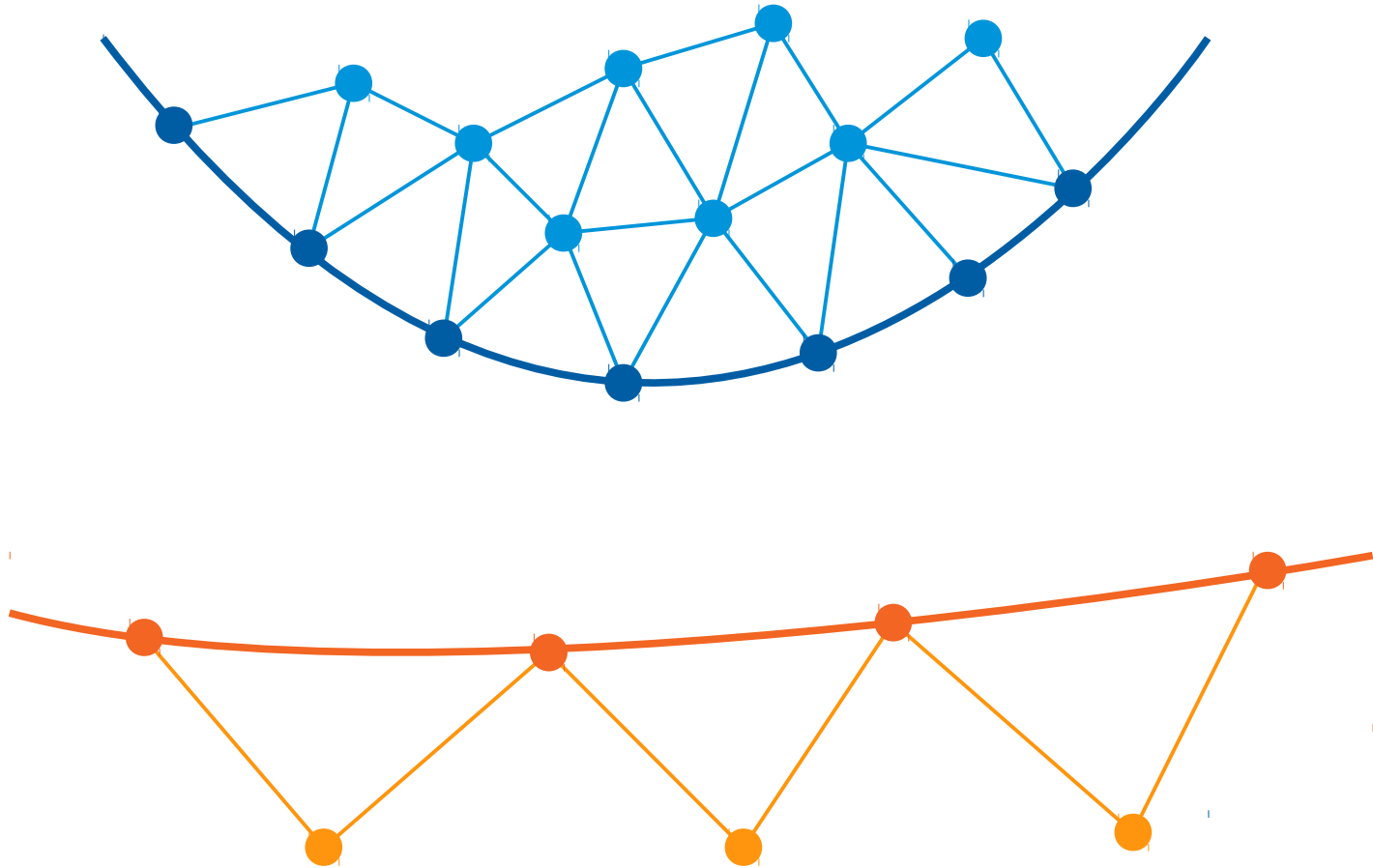
Primary References

- *Abaqus/CAE User's Manual*, §15
- *Abaqus Analysis User's Manual*, §2.3
- *Getting Started with Abaqus: Keywords Edition*, §3.2, 12
- *Abaqus Theory Manual*, §5



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Surface Interactions



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Models (Abaqus/Standard)

- **General Contact**—highly automated, based on all-inclusive surface definition
 - *simple models, rubber, solid propellant, elastomer*
- **Contact Pairs**—explicit pair surfaces (like ANSYS APDL)
 - *metal, clay, ice at low strain*
- **Contact Elements**—
- **Contact Properties**—friction, pressure–overclosure, spot welds

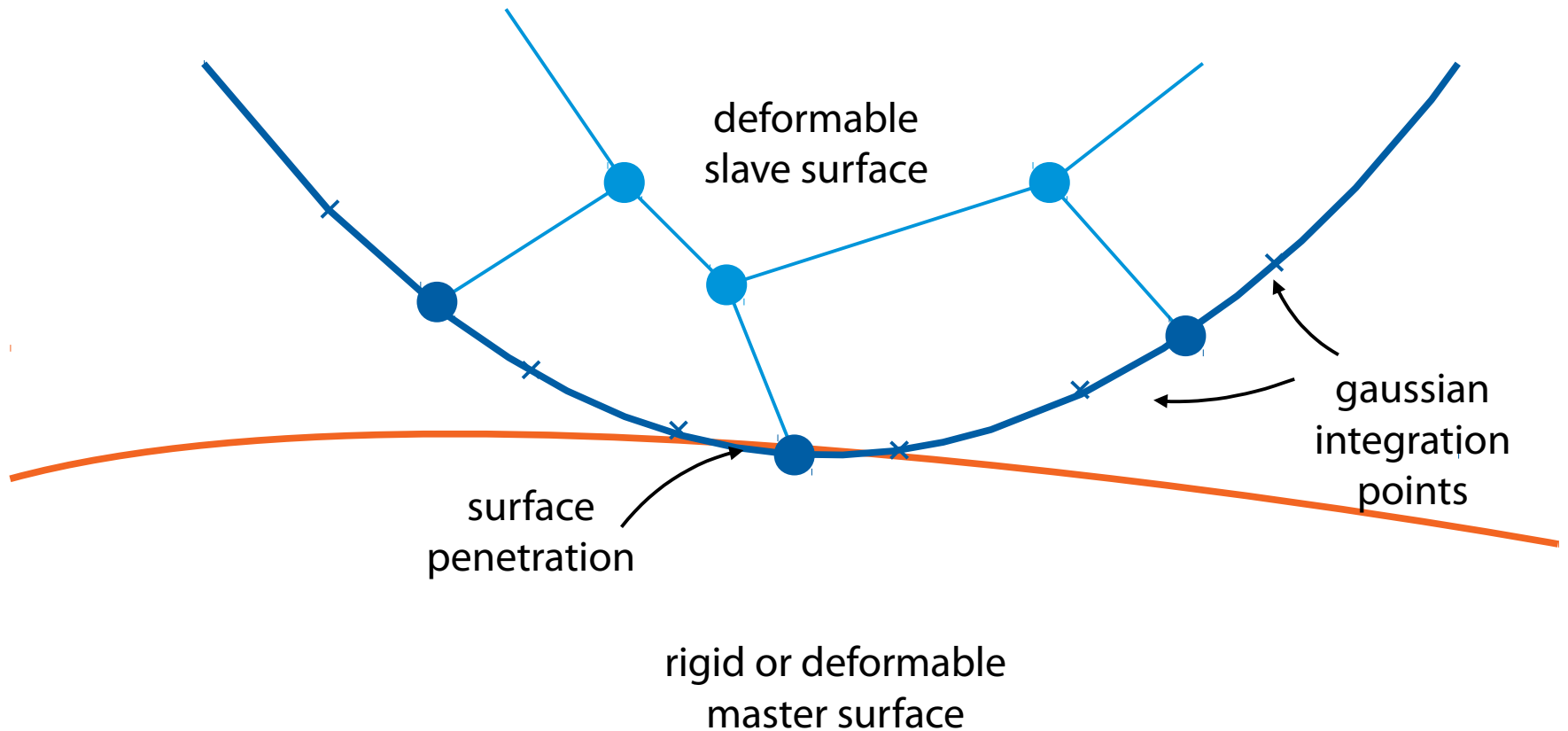
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Surfaces (Abaqus/Standard)

- **Element-based**—associate surface area w/ node, calculated contact stress
 - **Single-sided**—test for contact in direction of normal
 - **Double-sided**—more general (more expensive)
 - **Edge-based**—perimeter edges of model (shells)
- **Node-based**—similar to edge-based but using nodes
- **Analytical**—mobile but perfectly rigid

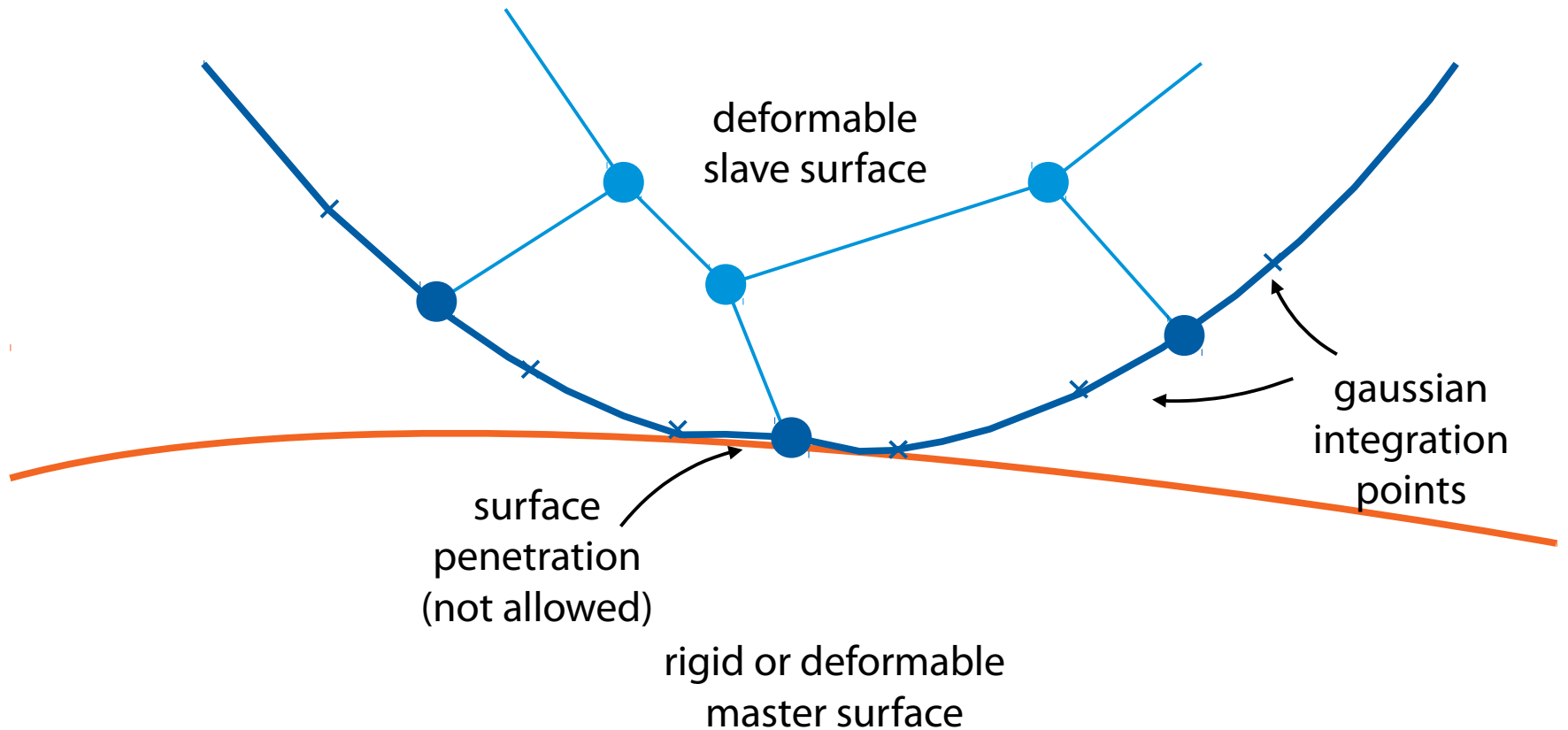
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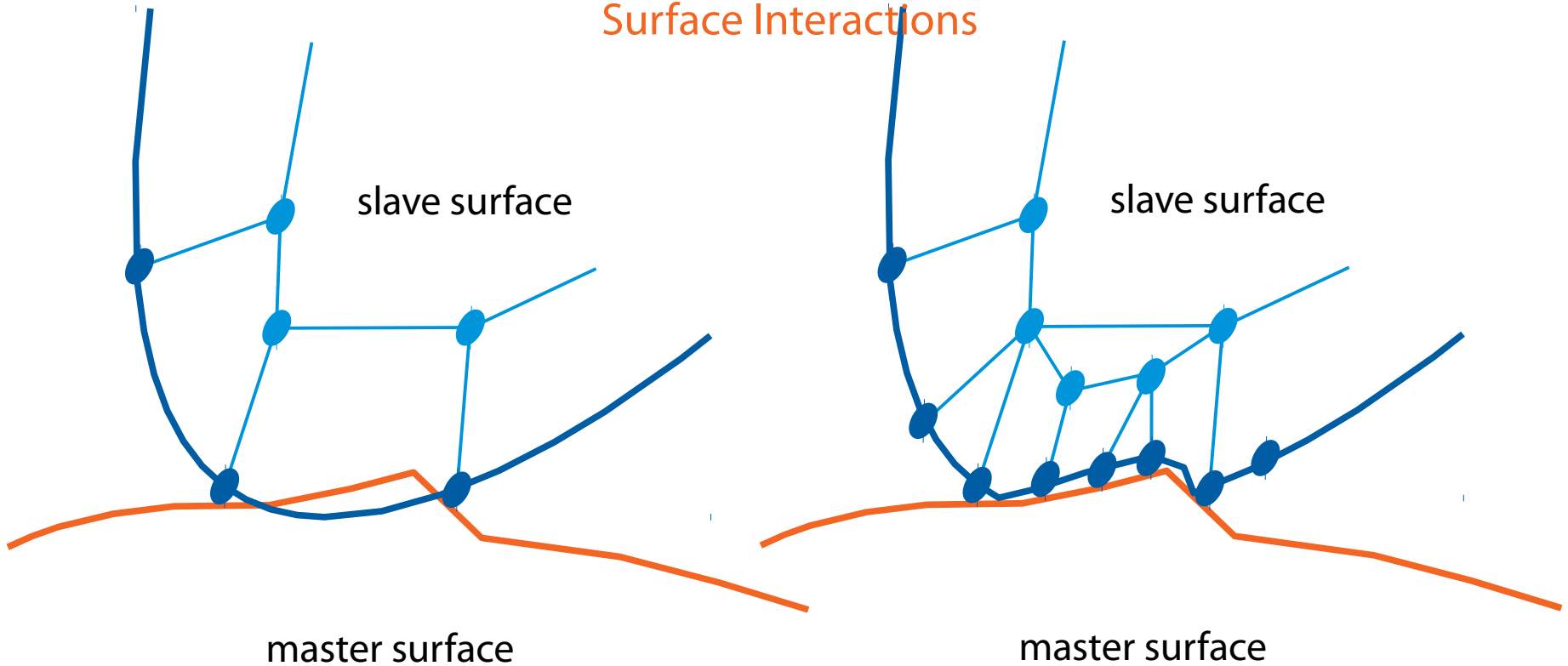
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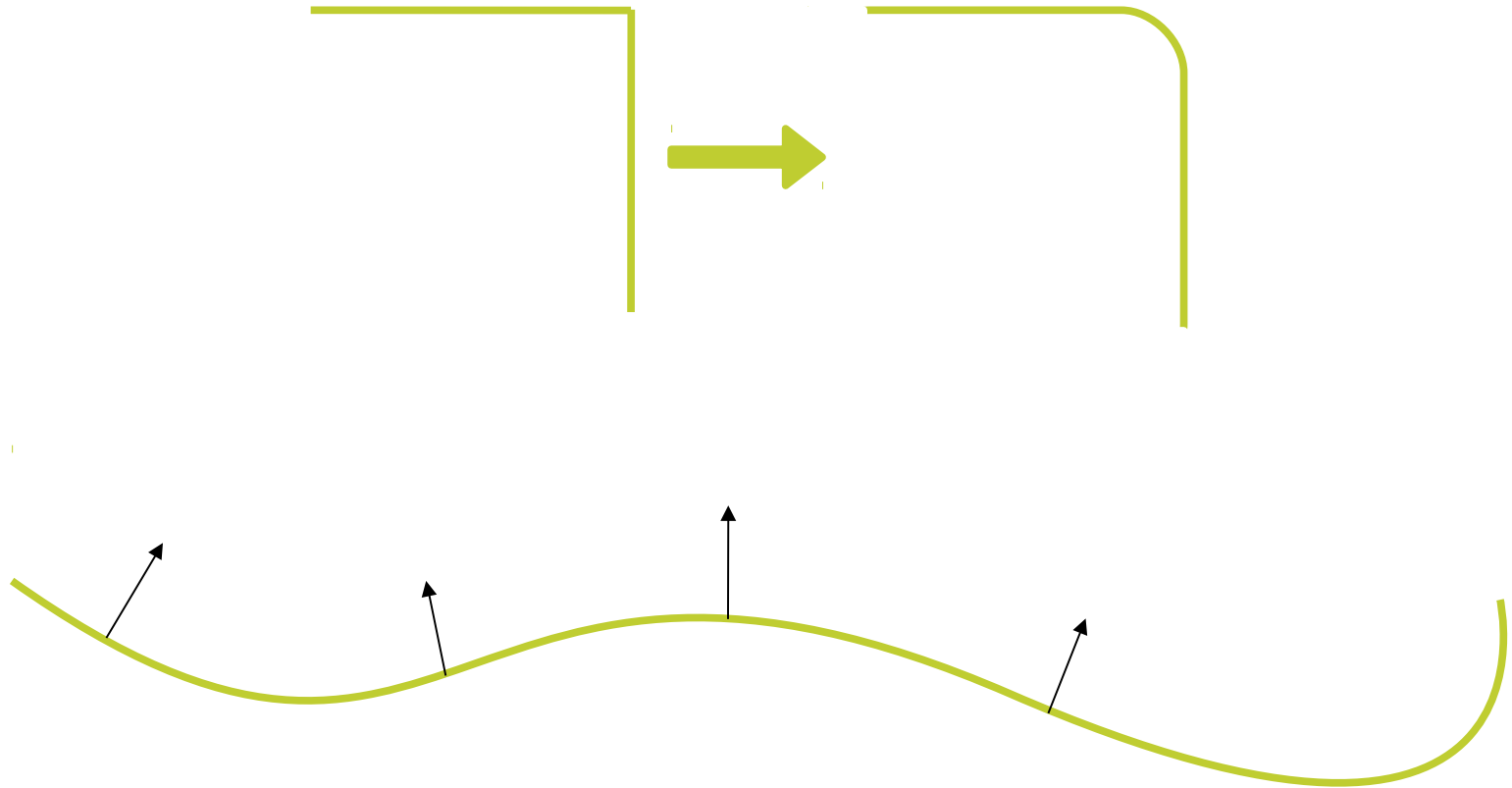
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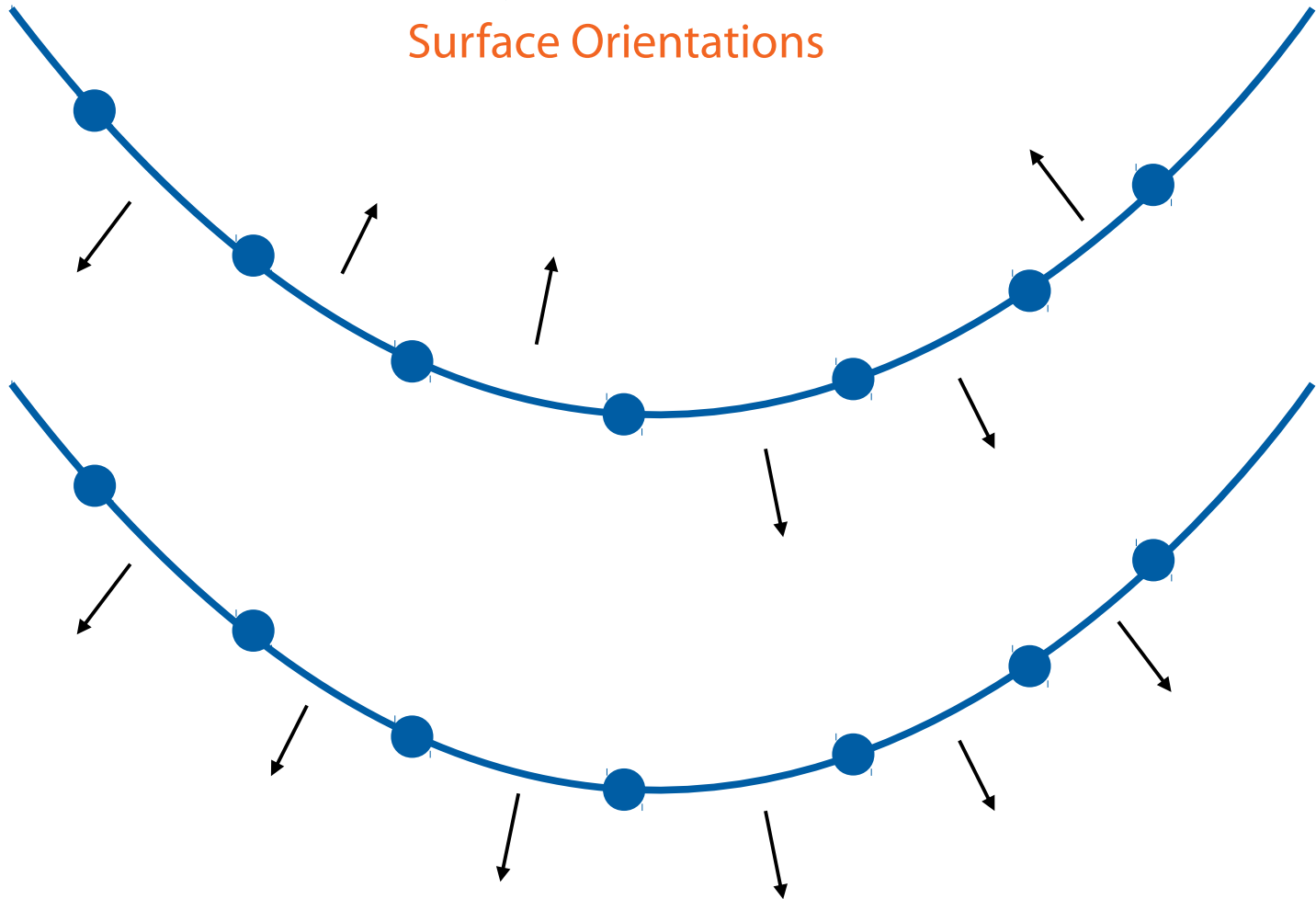
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Rigid Surfaces



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Surface Orientations



ABAQUS Fracture

Cohesive Zone Model

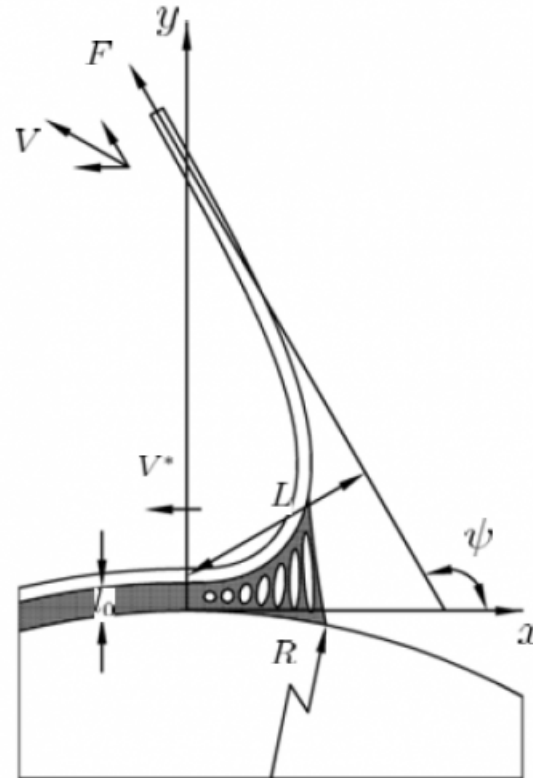
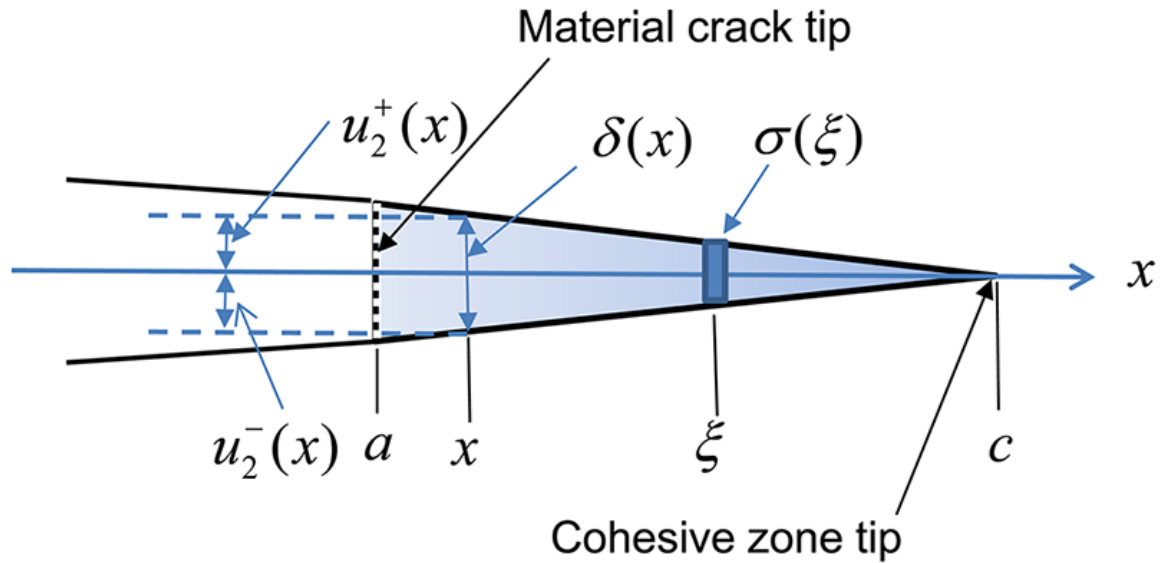
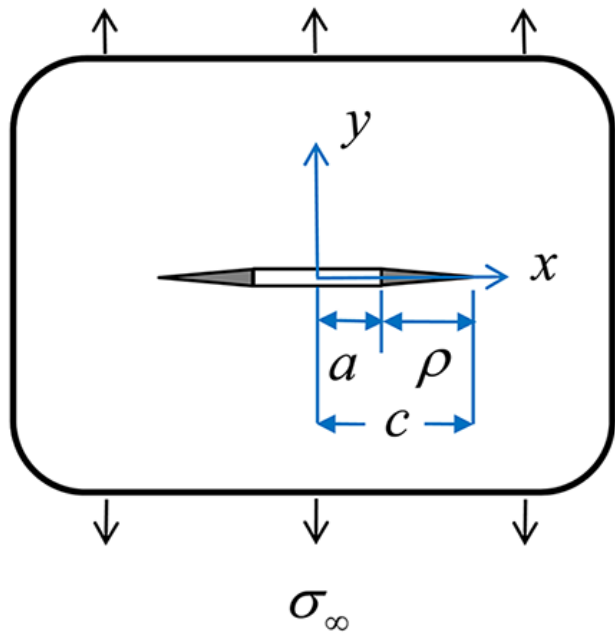
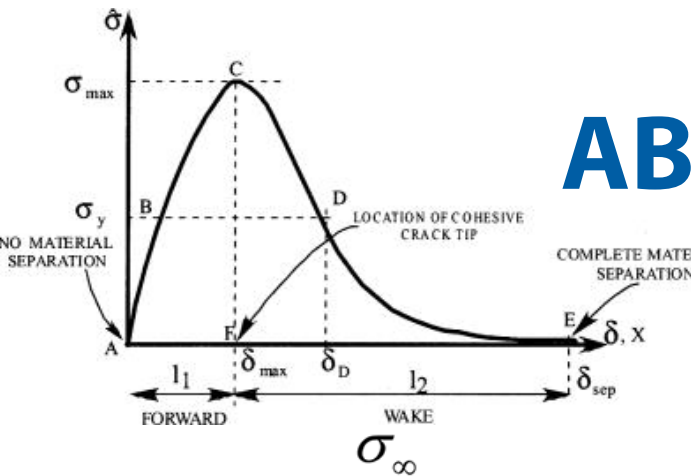


Figure 1. A cohesive zone model of the peel test.

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Cohesive Zone Model



a) Cohesive zone at crack tips

b) Cohesive traction σ and cohesive zone opening displacement δ