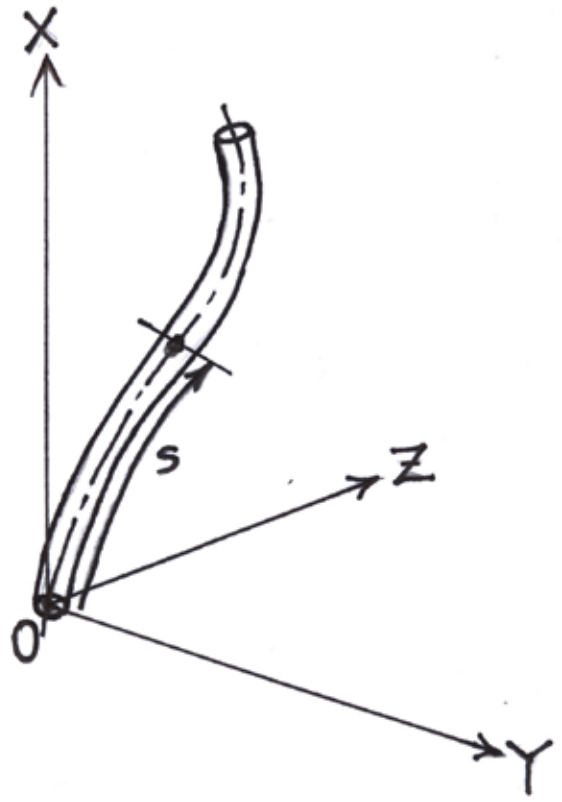
# DEFINITION OF REFERENCE SYSTEMS IN VIVA

Michael Triantafyllou
AMT/MIT
Cambridge Massachusetts

- Global coordinate system (X,Y,Z) and Lagrangian coordinate s

**Figure 1**

Global coordinate system $X, Y, Z$.

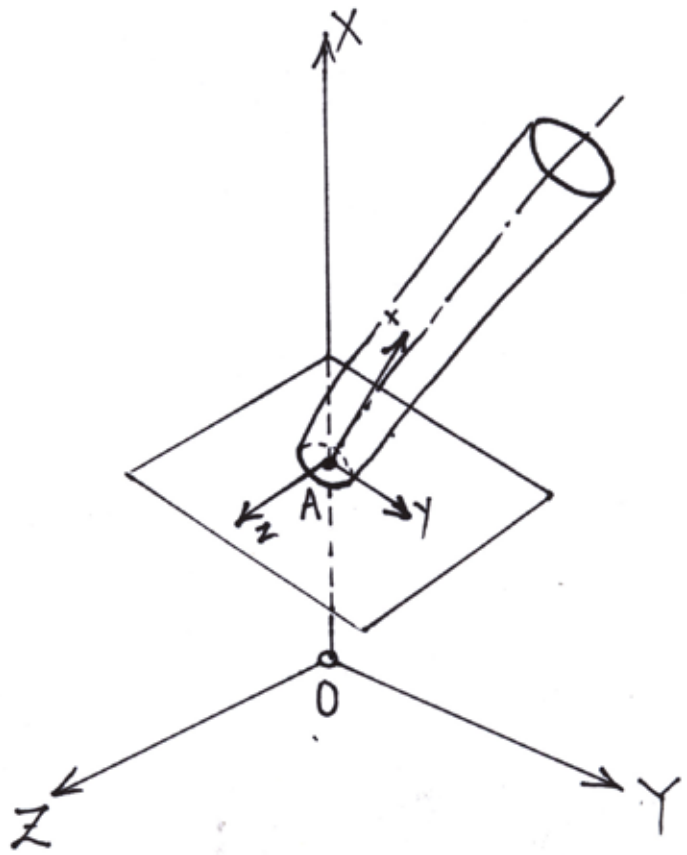


Local system (x,y,z) at point A versus global system (X,Y,Z)

**Figure 2**

Local versus global system.

- $Ax$ axis is tangent to the riser configuration at point A.
- $Az, Ay$ axes define the plane perpendicular to $Ax$.
- $Az$ axis is parallel to plane $ZX$.
- $Ay$ axis is perpendicular to axis $Az$.

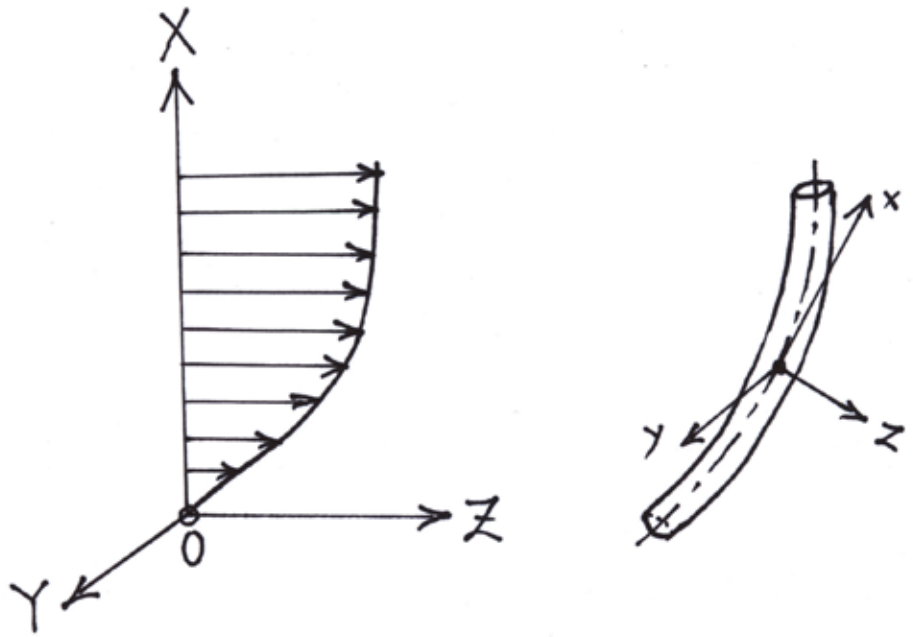


EXAMPLE:

Two-dimensional static configuration, current in XZ plane

**Figure 3**

**Example:** Two-dimensional static configuration, unidirectional current, both contained in plane $XZ$.




- $Ax$ axis is tangent to the riser configuration at point A.
- $Ay$ axis parallel to axis $Y$.
- $Az$ axis perpendicular to $Ax$ within plane $XZ$.

# General case

For a curved riser and three dimensional current, decomposition is not strictly valid. We ask the user to find the plane perpendicular to the riser configuration at point A, called plane ABC. The intersection of the planes XZ and ABC define axis Az. The axis Ay is within plane ABC perpendicular to axis Az. Ax is tangent to the riser configuration.

- Definition of general case

**Figure 2**

Local versus global system.

- $Ax$ axis is tangent to the riser configuration at point A.
- $Az, Ay$ axes define the plane perpendicular to $Ax$.
- $Az$ axis is parallel to plane $ZX$.
- $Ay$ axis is perpendicular to axis $Az$.