

## MAXIMUM STRESS CRITERION FOR BRITTLE MATERIALS:

$|\sigma_1| < \sigma_u$ ,  $|\sigma_2| < \sigma_u$  AND  $|\sigma_3| < \sigma_u$  FOR BRITTLE

$\sigma_u$  - ULTIMATE TENSILE STRESS.

$\sigma_1, \sigma_2, \sigma_3$  - PRINCIPLE STRESSES.

### MÖHR'S CRITERION:

$\sigma_{uc} > \sigma_{ut}$  FOR BRITTLE.

$\sigma_{uc}$  - ULTIMATE COMPRESSIVE STRENGTH.

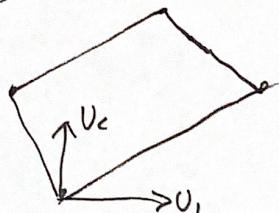
$\sigma_{ut}$  - ULTIMATE TENSILE STRENGTH.

- IMPROVED NORMAL STRESS CRITERION.

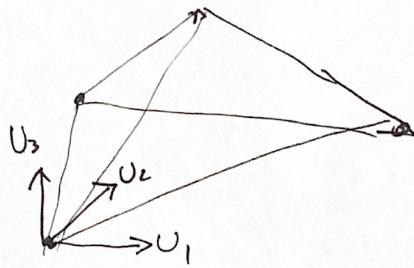
## NODAL DEGREE OF FREEDOM:

- INDEPENDENT VARIABLES AT A NODE AFFECTING THE RANGE OF STATES IN WHICH A SYSTEM MAY EXIST.
- DETERMINED BY TYPES OF ELEMENT.

### SOLID CONTINUUM ELEMENTS



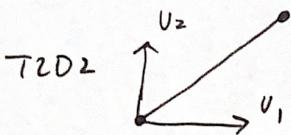
$$2 \times 4 = 8 \text{ TOTAL DOFs}$$



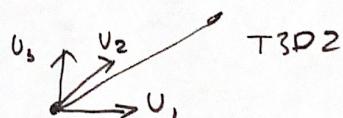
$$3 \text{ DOF PER NODE}$$

$$3 \times 4 = 12 \text{ TOTAL DOFs}$$

### TRUSS

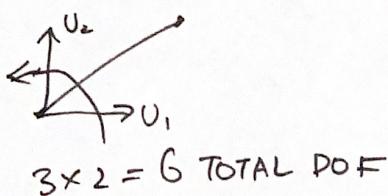


$$2 \times 2 = 4 \text{ TOTAL DOFs}$$

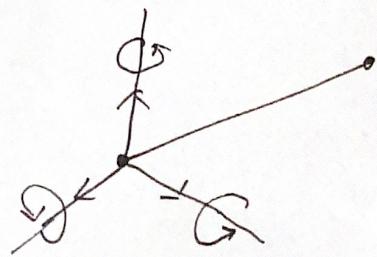


$$3 \times 2 = 6 \text{ TOTAL DOFs}$$

### BEAM DOF :



$$3 \times 2 = 6 \text{ TOTAL DOFs}$$



$$2 \times 6 = 12 \text{ TOTAL DOFs} .$$