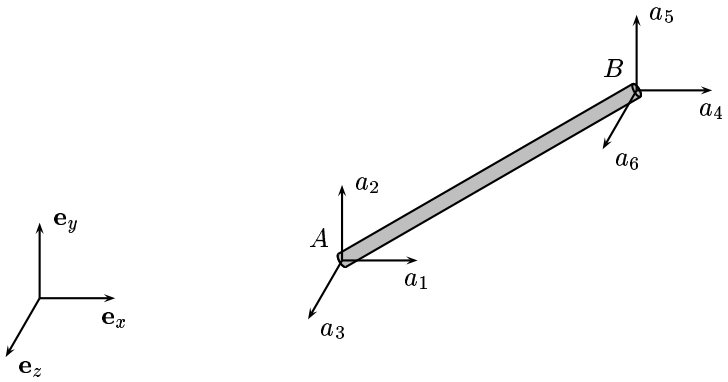
Purpose:

Compute element stiffness matrix for a three-dimensional bar element. The element can be used for large deformations and rotations and is based on Green-Lagrange's strain tensor.



Syntax:

Ke=bar3ge(ec,ep,ed,es)

Description:

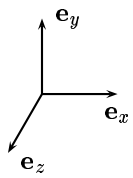
bar3ge provides an element stiffness matrix Ke for a three-dimensional bar element. The input variables

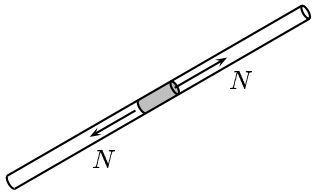
$$\mathsf{ec} = \begin{bmatrix} x_1 & x_2 \\ y_1 & y_2 \\ z_1 & z_2 \end{bmatrix} \qquad \mathsf{ep} = [\ E\ A_\circ\ ] \qquad \mathsf{ed} = \begin{bmatrix} a_1 & a_2 & \dots & a_6 \end{bmatrix} \qquad \mathsf{es} = [\ N\ ]$$

supply the element nodal coordinates x_1, y_1, x_2 etc. in the undeformed configuration, the modulus of elasticity E, the cross section area $A_\circ$, the normal force N. The nodal displacements $u_1 ... u_6$ are obtained by the function extract.

Purpose:

Compute the strain and normal force in a three dimensional bar element.





Syntax:

[es,ee]=bar3gs(ec,ep,ed)

Description:

bar3gs computes the strain, Green-Lagrange E_s, and the normal force N in the reference configuration

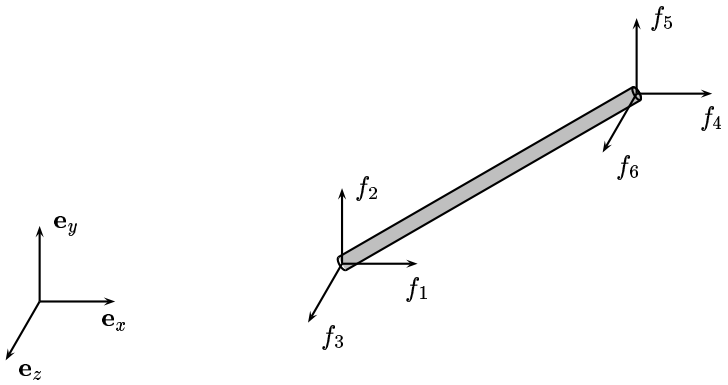
$$\mathsf{es} = [\ N\ ] \qquad \mathsf{ee} = [\ E_s\ ]$$

for a three dimensional bar element.

The input variables ec, ep and ed are defined in bar3ge.

Purpose:

Compute the internal element force vector for a three dimensional bar element.



Syntax:

ef=bar3gf(ec,ed,es)

Description:

bar3gf computes the internal element force vector

$$\mathsf{ef} = \mathbf{F}_{int}^{eT} = [f_1\ f_2\ \ldots f_6]$$

for a three dimensional bar element.

The input variables ec, ed and es are defined in bar3ge. To form the global internal force vector use can be made of insert command.