

3D Principal Stress Calculator

> with(linalg):

> $s_{xx} := 50;$

$s_{xx} := 50$

> $s_{yy} := 0;$

$s_{yy} := 0$

> $s_{zz} := -20;$

$s_{zz} := -20$

> $s_{xy} := 30;$

$s_{xy} := 30$

> $s_{yz} := 0;$

$s_{yz} := 0$

> $s_{xz} := 0;$

$s_{xz} := 0$

> $stress := \begin{bmatrix} s_{xx} & s_{xy} & s_{xz} \\ s_{xy} & s_{yy} & s_{yz} \\ s_{xz} & s_{yz} & s_{zz} \end{bmatrix}$

$stress := \begin{bmatrix} 50 & 30 & 0 \\ 30 & 0 & 0 \\ 0 & 0 & -20 \end{bmatrix}$

> $C2 := s_{xx} + s_{yy} + s_{zz};$

$C2 := 30$

>

> $C1 := s_{xx} * s_{yy} + s_{xx} * s_{zz} + s_{yy} * s_{zz} - s_{xy}^2 - s_{yz}^2 - s_{xz}^2;$

$C1 := -1900$

> $C0 := s_{xx} * s_{yy} * s_{zz} + 2 * s_{xy} * s_{yz} * s_{xz} - s_{xx} * s_{yz}^2 - s_{yy} * s_{xz}^2 - s_{zz} * s_{xy}^2;$

$C0 := 18000$

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[ > fsolve (x^3 - C2*x^2 + C1*x - C0 = 0) ;
      -20.00000000, -14.05124838, 64.05124838
[ >
[ > eigenvects (stress) ;
      [25 + 5*sqrt(61), 1, {[5/6 + 1/6*sqrt(61), 1, 0]}], [25 - 5*sqrt(61), 1, {[5/6 - 1/6*sqrt(61), 1, 0]}], [-20, 1, {[0, 0, 1]}]
[ >
[ >
[ >

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