

Answers to Selected Problems: Part II, Chapter 7

7.1

1. $\sqrt{v_i v_i}, v_1, v_k$
3. $3, 3, \delta_{ik}$
6. No
7. $a_i b_i c_j$
9. $A_{ij} B_{kj}, v_i A_{ij} v_j, B_{ji} A_{jk} B_{kl}$
10.
$$\begin{bmatrix} -1/\sqrt{2} & 0 & 1/\sqrt{2} \\ 1/2 & 1/\sqrt{2} & 1/2 \\ -1/2 & 1/\sqrt{2} & -1/2 \end{bmatrix}$$
11.
$$\begin{bmatrix} \sqrt{3} + 3/2 \\ -1 + 3\sqrt{3}/2 \end{bmatrix}$$
12.
$$\frac{1}{4} \begin{bmatrix} 5 + 2\sqrt{3} & \sqrt{3} - 6 \\ \sqrt{3} + 10 & 7 - 2\sqrt{3} \end{bmatrix}$$

7.2

1. $\sqrt{v_i v_i}, v_1, v_k$
- 3.

Section 7.2

1. $\sigma_N = 4/3, \sigma_S \approx 2.62$
2.
$$\begin{bmatrix} 4 & 0 & \sqrt{2} \\ 0 & -2 & -\sqrt{2} \\ \sqrt{2} & -\sqrt{2} & -2 \end{bmatrix}$$
4. The 2D stress transformation equations
5. $\sigma_i = 1, 2, 3$
$$\mathbf{n}_1 = \frac{1}{\sqrt{2}} \mathbf{e}_1 - \frac{1}{\sqrt{2}} \mathbf{e}_2, \mathbf{n}_2 = \frac{1}{\sqrt{2}} \mathbf{e}_1 + \frac{1}{\sqrt{2}} \mathbf{e}_2, \mathbf{n}_3 = \mathbf{e}_3$$

$$\tau_{\max} = 1$$