Prob. 10.6

Transformation matrix (Eq. 10.4):

```
with(linalg);
A:=matrix(3,3,[[c^2,s^2,2*s*c],[s^2, c^2,-2*s*c],[-s*c,s*c,c^2-s^2]]);
```

$$A := \begin{vmatrix} c^2 & s^2 & 2\,s\,c \\ s^2 & c^2 & -2\,s\,c \\ -s\,c & s\,c & c^2 - s^2 \end{vmatrix}$$

Define trig functions and angle:

```
Digits:=4;c:=cos(theta);s:=sin(theta);theta:=30*Pi/180;
```

Transformation matrix evaluated:

```
evalf(map(eval, A));
```

$$\begin{vmatrix} .7500 & .2500 & .8660 \\ .2500 & .7500 & -.8660 \\ -.4330 & .4330 & .5000 \end{vmatrix}$$

Define stress pseudovector:

```
sigma:=matrix(3,1,[1,-2,3]);
```

$$\sigma := \begin{vmatrix} 1 \\ -2 \\ 3 \end{vmatrix}$$

Transformed stress (Eq. 10.5)

```
sigma_prime:=evalf(map(eval, evalm(A&*sigma)));
```

$$sigma\_prime := \begin{vmatrix} 2.848 \\ -3.848 \\ .201 \end{vmatrix}$$

Define strain pseudovector:

```
epsilon:=matrix(3,1,[.01,-.02,.03]);
```

$$\varepsilon := \begin{vmatrix} .01 \\ -.02 \\ .03 \end{vmatrix}$$

Reuter's matrix (Eq. 10.7):

```
R:=matrix(3,3,[[1,0,0],[0,1,0],[0,0,2]]);
```

$$R := \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 2 \end{vmatrix}$$

Transformed strain (Eq. 10.8):

```
epsilon_prime:=evalf(map(eval,evalm(R&*A&*inverse(R)&*epsilon)));
```

$$epsilon\_prime := \begin{vmatrix} .01549 \\ -.02549 \\ -.01098 \end{vmatrix}$$