

### 1 Spin One Eigenvectors

The operator  $\hat{S}_x$  for spin-1 particles, can be written in matrix form in the  $S_z$  basis as:

$$\hat{S}_x = \frac{\hbar}{\sqrt{2}} \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix}$$

- (a) Find the eigenvalues of this matrix.
- (b) Find the eigenvectors corresponding to each eigenvalue.