

1. Find a basis of the nullspace of

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}.$$

2. Show that the equation

$$6x^2 + 7y^2 + 8z^2 + 6xy + 8yz + 2zx = 1$$

defines an ellipsoid.

3. Let  $A$  be a real  $m \times n$  matrix. Show that  $R(A)$  has a basis consisting of eigenvectors of  $A^T A$  associated with positive eigenvalues.

**The End**