

Questions

1. Let b be a $(p \times 1)$ vector. Find the gradient vector and Hessian matrix of $f(b) = b'b$.
2. Prove that a diagonal matrix is positive definite if all diagonal elements are positive, and negative definite if all diagonal elements are negative.
3. Consider the linear model $y = Xb + e$, with y a $(p \times 1)$ vector, X a $(p \times k)$ matrix with rank k , b a $(k \times 1)$ and e a $(p \times 1)$ vector, with y and X given. Find the vector b^* that minimizes the function $f(b) = e'e$.