

NUMERICAL ANALYSIS

1997-1998

Comprehensive Examination

Closed Book

1.(15 points) What is the condition number of a nonsingular matrix A ? If we want to solve $Ax = b$ and indeed solve $Ax' = b'$ where b' is a perturbation of b , show how the condition number relates the relative error of the solution to the relative error in the data b .

2.(15 points) Consider the approximation

$$f'(x) = (f(x+h) - f(x-h))/2h + O(h^2)$$

and generate an $O(h^4)$ accurate approximation to $f'(x)$ using Richardson extrapolation assuming f is as differentiable as you need.

TEST, BUT
NO SOLUTIONS AVAILABLE