Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Programming: What programming language do you know?

\_\_\_ MATLAB

\_\_\_ Python

\_\_\_ Fortran

\_\_\_ C

\_\_\_ Java

\_\_\_ Other (specify)

Linear algebra: Can you calculate the following?

\_\_\_ matrix inverse

\_\_\_ determinant

\_\_\_ eigenvalue/eigenvector

\_\_\_ LU decomposition

\_\_\_ QR decomposition

\_\_\_ singular value decomposition

\_\_\_ Householder transformation

\_\_\_ Gram-Schmidt orthogonalization

\_\_\_ Schur complement

\_\_\_ Gaussian elimination

\_\_\_ inner (dot) product

\_\_\_ matrix-vector product

\_\_\_ matrix-matrix product

\_\_\_ matrix norm

\_\_\_ vector norm

Calculus: Do you know definition of the following?

\_\_\_ derivative

\_\_\_ integral

\_\_\_ gradient

\_\_\_ divergence

Calculus: Can you calculate the following?

\_\_\_ derivative of polynomial function

\_\_\_ derivative of exponential function

\_\_\_ derivative of trigonometric functions

\_\_\_ derivative of hyperbolic functions

\_\_\_ integral of polynomial function

\_\_\_ integral of exponential function

\_\_\_ integral of trigonometric functions

\_\_\_ integral of hyperbolic functions

Linear solvers: Can you calculate the following?

\_\_\_ 2 equations with 2 unknowns

\_\_\_ N equations with N unknowns

\_\_\_ N equations with M unknowns (N > M)

\_\_\_ N equations with M unknowns (N < M)

Linear solvers: Do you know any of the following linear solvers?

\_\_\_ direct solver (specify)

\_\_\_ iterative solver (specify)

\_\_\_ stationary solver (specify)

\_\_\_ non-stationary solver (specify)

\_\_\_ any linear solver (specify)

Non-linear solvers: Do you know any of the following non-linear solvers?

\_\_\_ Newton method

\_\_\_ fixed point iteration

\_\_\_ any non-linear solver (specify)

ODE: Do you know the following?

\_\_\_ solver linear ODE analytically (specify what method)

\_\_\_ solve system of linear ODE analytically (specify what method)

\_\_\_ solver linear ODE numerically (specify what method)

\_\_\_ solve system of linear ODE numerically (specify what method)

PDE: Do you know the following?

\_\_\_ difference between parabolic, elliptic, hyperbolic PDE

\_\_\_ solve linear PDE analytically (specify what method)

\_\_\_ solve system of linear PDE analytically (specify what method)

\_\_\_ solve linear PDE numerically (specify what method)

\_\_\_ solve system of linear PDE numerically (specify what method)

Other: Do you know the following concepts?

\_\_\_ implicit/explicit method

\_\_\_ conditioning

\_\_\_ truncation error

\_\_\_ accuracy (order)

\_\_\_ stability, convergence, consistency

\_\_\_ finite difference

\_\_\_ finite element

\_\_\_ finite volume

\_\_\_ 1-D polynomial interpolation

\_\_\_ multi-D polynomial interpolation

\_\_\_ Taylor expansion

\_\_\_ linear least-square fit

\_\_\_ non-linear least-square fit