Otto-von-Guericke-University Magdeburg
Max Planck Institute for Dynamics of Complex Technical Systems
Computational Methods in Systems and Control Theory

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Winterterm 2020/2021

Scientific Computing 1
6th worksheet for online events
12/21/2020

Exercise 1:

In many cases it is not necessary to compile and link the whole LAPACK library to a program, e.g., if one only needs a single driver routine from it.

a.) Search for a driver which computes the eigenvalues and eigenvectors of a general real matrix on http://www.netlib.org/lapack/double/. Download it together with its dependencies.

b.) Write a `Makefile` which creates a small static library called `liblapack_pocket.a` containing the eigenproblem solver together with its dependencies.

c.) Write a small C program which uses this library to compute all eigenvalues and eigenvectors of

$$A = \begin{pmatrix} -3 & 8 & -2 & 1 \\ 6 & -4 & 1 & 5 \\ 2 & 5 & -8 & 8 \\ 1 & 5 & -8 & -7 \end{pmatrix}$$

Hint: Subroutines from BLAS are not automatically included as dependencies in the download. That means either BLAS needs to be linked to the program, or the corresponding files need to be downloaded separately.