

Review of part five of the course

The last part of the course took three weeks and we can divide the topics also roughly as:

1. building interactive web pages;
2. the numpy, scipy, and sympy stack;
3. Maxima, GAP, PARI/GP, Singular and R.

Below are some additional, preliminary questions.

21. Consider the curve defined by $r = \sin(8t)$. Make an interact to plot this curve.
The range for t always starts at zero. The end of the range for t is controlled by a slider. The initial value for the end is $\pi/2$. The increment for the end value is $\pi/40$.
22. Use numpy to solve a 5-by-5 tridiagonal system $Ax = b$.
 - (a) The diagonal element of A is 5, the elements just above and below the diagonal are one. Everywhere else the matrix is zero.
 - (b) Define a 5-dimensional right hand side vector b of ones. Solve the system $Ax = b$ and compute the residual.
23. Consider the polynomial system defined by the polynomials $p = x^2y - 2x + 3$ and $q = xy^2 - 2y + 3$.
 - (a) Bring the system in triangular form. Use this triangular form to determine the number of complex solutions.
 - (b) If N is the number of solutions, compute the companion matrix of the system. The rows of this matrix are the reductions of the products of y with y^k for k ranging between 0 and $N - 1$. Show that the y -coordinates of the solutions are the eigenvalues of this companion matrix.

While representative for the type of questions you may get on the final exam, this list of questions is by no means exhaustive. You must review homework assignments and quiz problems as well.

FINAL EXAM is in Lab SE0 2263 on Thursday 5 May 2016, 10:30-12:30PM

In case of a scheduling conflict with another final exam, please let me know as soon as possible so we can schedule a makeup.