EE257/GP 258 Extra Handout Eigen

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If you want to use C++ for lab2, you might use a library called Eigen for this homework.

Basic Eigen - installing

Download eigen: http://eigen.tuxfamily.org/index.php?title=Main_Page

tar xvfj eigen-eigen-5097c01bcdc4.tar.bz2
cd eigen-eigen-5097c01bcdc4
mkdir build_dir
cd build_dir
cmake -DCMAKE_INSTALL_PREFIX=/path/to/install .. (Please change the red part to any directory that you want to install Eigen)
make install

Note, if cmake is not installed on your system, you can get binary versions of cmake at

http://www.cmake.org/cmake/resources/software.html

Compile C++ code that uses Eigen

g++ -I/path/to/eigen/dir/include/eigen3 filename.cpp

(Please change the red part to any directory that you installed Eigen)

Example - Solving a system and using vectors/matrices

```
#include <Eigen/LU>
#include <Eigen/Dense>
#include <iostream>
using namespace Eigen;

int main()
{
  MatrixXd A = MatrixXd::Random(4,4);
  VectorXd b = VectorXd::Random(4);
  VectorXd x;
  x = A.lu().solve(b);
```

```
  std::cout << "A=" << A << std::endl << std::endl;
  std::cout << "x=" << x << std::endl << std::endl;
  std::cout << "b=" << b << std::endl << std::endl;

}
```

Example - Inverse

```
#include <Eigen/LU>
#include <Eigen/Dense>
#include <iostream>
using namespace Eigen;

int main()
{
  MatrixXd A = MatrixXd::Random(4,4);
  MatrixXd Ainv;
  Ainv = A.lu().inverse();

  std::cout << "A=" << A << std::endl << std::endl;
  std::cout << "Ainv=" << Ainv << std::endl << std::endl;

}
```

More examples

Please check the documentation at

http://eigen.tuxfamily.org/index.php?title=Main_Page