Lab #12: Use of PETSc

PCSE 2015

Justification

In this lab you will take a number of small PETSc examples and add functionality to them.

`init.c`

This program takes a commandline argument and prints it out.

1. Look up the routine `PetscPrint` and use it so that the value gets printed only once.
2. Look up the routines `PetscSynchronizedPrintf` and `PetscSynchronizedFlush` and use them so that each process prints a line like 'I am process 5 out of 25', and they are printed in the proper sequence.

`mul.c`

This program constructs a vector and matrix, does the matrix-vector product, and views the result.

1. Use `VecSetValue` or `VecSetValues` to fill in the vector. Run the program. Did you get output as expected?
2. Fill in some off-diagonal elements on the matrix, for instance making a tridiagonal matrix. Use `MatSetValue` or `MatSetValues`.
3. Change one of the values in `MatMPIAIJSetPreallocation` to zero. What happens when you run the program? Do you understand the message?