Using Matlab on ACES

ACES Training
April 16, 2024

High Performance Research Computing
DIVISION OF RESEARCH
Outline

- Running the Matlab GUI on the Portal
- Parallel Matlab: Multi Threading
- Parallel Matlab: Multi Processing
  - Cluster Profiles
  - Parallel Programming
  - GPUs
- Generating and submitting batch jobs using Drona Composer
- CASE Study: Monte Carlo Pi (time permitted)
Accessing the ACES Portal

HPRC webpage: hprc.tamu.edu
Login to ACES through ACCESS

Log-in using your ACCESS credentials.

Select the Identity Provider appropriate for your account.
1. Click on “Interactive Apps”
2. Select “Matlab_training”
3. Fill out the Form
   - Set time to 3 hours, threads to 8, memory 50GB
4. Click Launch
5. Once Matlab Job is running click on “Launch Matlab”
Demo Time

(Let’s visit the portal and start the Matlab GUI)
Matlab Parallel processing on ACES

Now we know to run Matlab on ACES, let’s do some parallel programming

1. Let’s go back to the Interactive Matlab session we just created
   - if the session was closed for some reason, click “Launch Matlab” again

2. Open the live script “matlab_aces.mlx”
   - Upload file to ACES
   - Copy from directory /scratch/training/Matlab/matlab_aces_spring24.mlx

3. We will use the live script to explain and practice
   - parallel processing using multi threading
   - discover parallel profiles
     - local profile
     - cluster profile
   - parallel pools / parallel concepts
   - GPU
Back to the live script
(time to do some parallel processing)
For non-interactive jobs, user has to create a batch script specifying the resources and the commands to run. To simplify this task, HPRC developed Drona Composer: a framework to create any kind of workflows. Here, we will use the Matlab environment to generate and submit a Matlab job.
Accessing the Drona Composer
Select Matlab version

Matlab specific parameters

Matlab Job parameters

Choose a name for the job

Optionally, change location of job

Optionally, upload additional Matlab scripts or input data

Select Matlab Environment from the list

Select the main Matlab script (can either reside on the cluster or local machine)

Matlab Job parameters

Click to generate job

#workers for parallel processing (max 96)

1

Use GPU

Select an option

Memory

Expected time needed to run Days Hours Minutes
Demo Time
(let’s create and submit a job using Drona Composer)
# this is the template to run matlab codes in the job composer

source /etc/profile

module load Matlab/R2023b

cd /scratch/user/ump108705/job_composer/Matlab_training_job

matlabsubmit -s 4 test.m

"echo "Done.""

- batch_job_id-XXX
  - file containing the Slurm batch id (mostly for convenience)
- matlabsubmit_wrapper.m
  - boilerplate matlab code to set up environment and call to the main Matlab script provided by user
- slurm.out
  - redirected output from the script
- submission_script
  - the generated Slurm batch script

matlabsubmit will create a directory, named MatlabSubmitLOG<N> where all generated files and redirected output will be stored (<N> is the matlabsubmit job ID)
Case Study
(time permitted, you will compute Pi using Monte Carlo method. using parfor, spmd, distributed, and gpu)
Thank you.

Any questions?