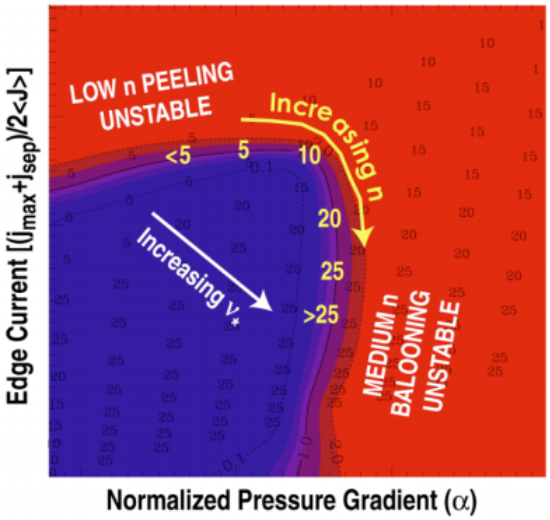
Running VARYPED and ELITE

DISCLAIMER:

This is an editable public document! When you make a change to it, it will be visible immediately by everyone! Feel free to edit it and help other OMFIT users!

The final goal of running these codes is to map out the stability diagram of a shot as such



https://doi.org/10.1088/1742-6596/123/1/012014

To do this you will need a shot you are familiar with where you have already created:

1. A kineticEFIT (g-file, and a-file)
2. A pFile

VARYPED is an OMFIT module that takes a kinetic EFIT and perturbes in alpha (normalized pressure gradient), and j (bootstrap current) space to create a set of g-files represented by each grid point above.

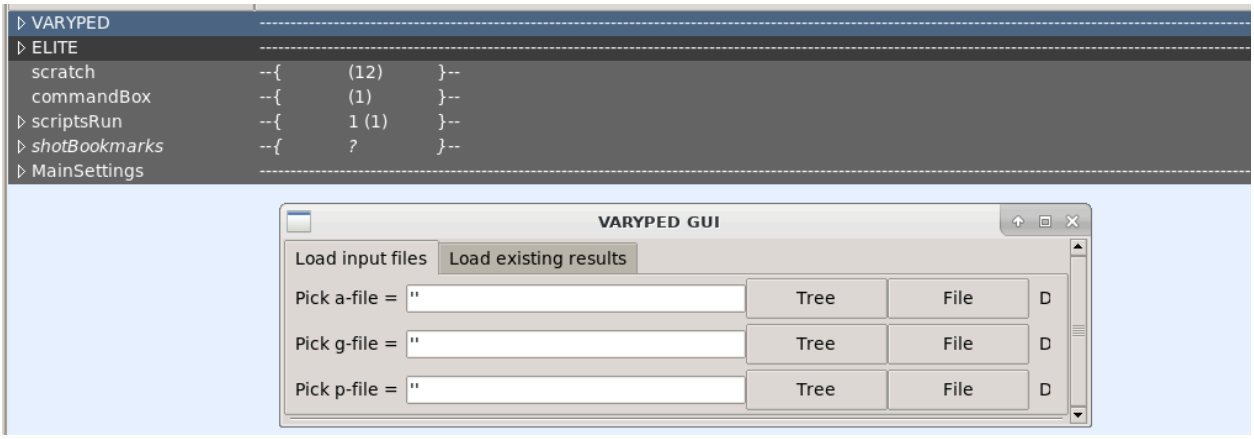
ELITE is an MHD stability code which takes an equilibrium and calculates the growth rate of a single or several mode numbers. ELITE must be run for the mode numbers you are interested in (usually between 5-25 and up to 45

It is recommended that the VARYPED & ELITE batch scripts be run on a computing cluster because they take advantage of parallelization. This example is run on iris.

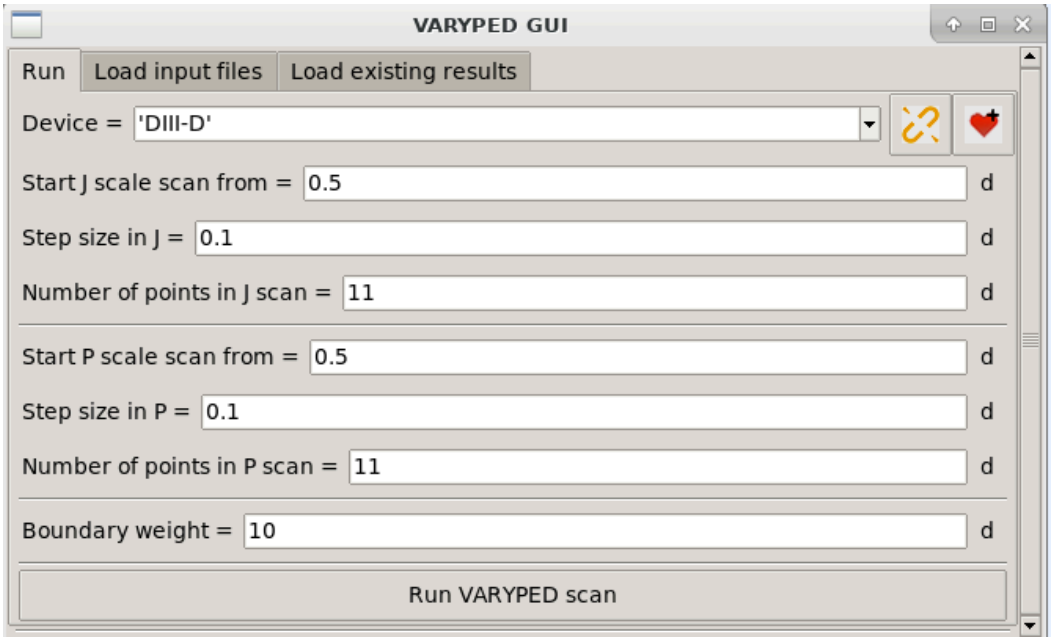
Letters in bold represent a button click or parameter to change

Open an OMFIT instance and import VARYPED and ELITE

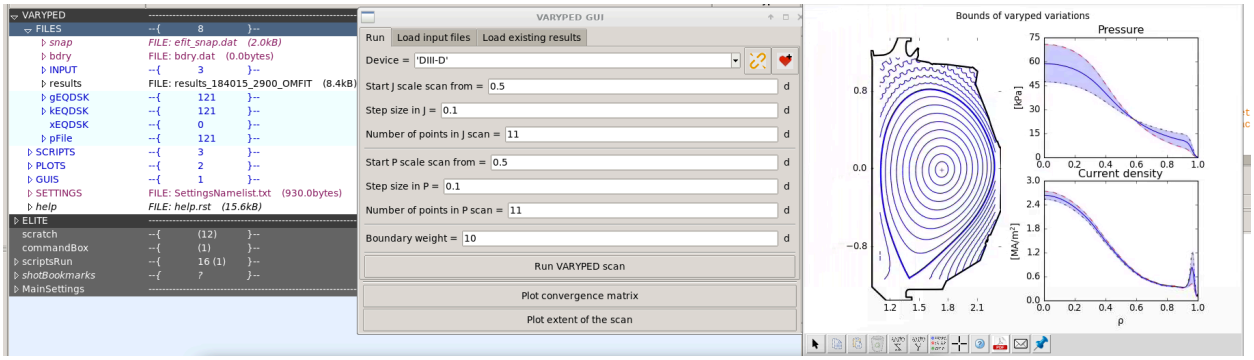
Summon the VARYPED GUI (double click the varyped module name) and import the g, a, and pFile from the tree or a file)



Select the grid parameters for your VARYPED scan



Start X scale scan from is a fraction of the kineticEFIT parameter at the edge. Here we will run from 0.5 to 1.5 in increments of 0.1. The total grid size is (number of points in J) x (number of points in P) so we will have a total of 121 grid points.

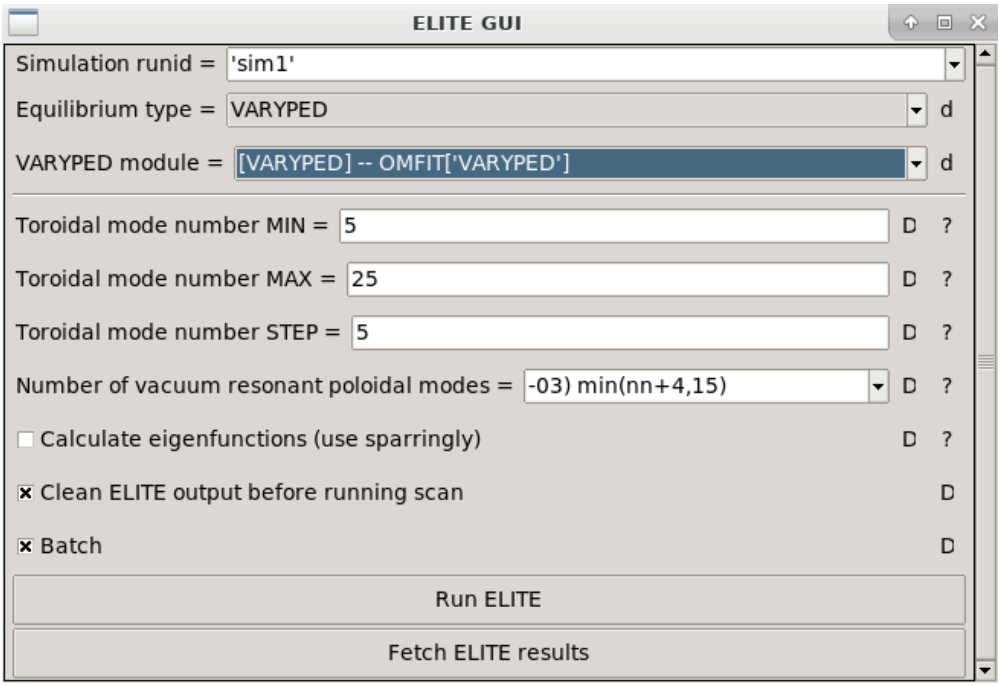


After the code completes and after **plot extent of scan** you should see:

Now enter the ELITE GUI and select VARYPED as the input:



Then choose the varyped module as the source of the inputs:



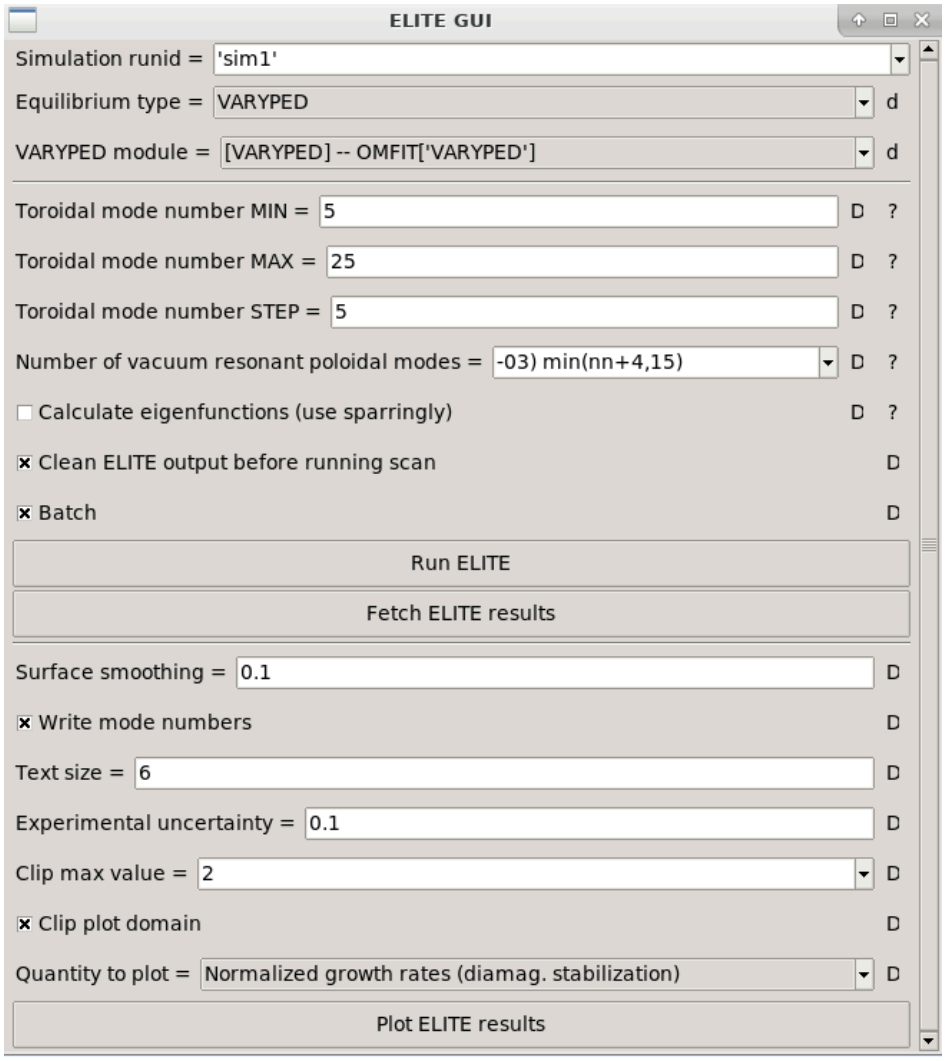
Choose the mode numbers you want to analyze and the step size. These defaults work pretty well and click **Run ELITE**

Go grab lunch. This will take anywhere from 10s of minutes to a few hours depending on how many ELITE instances must run. As an estimate:

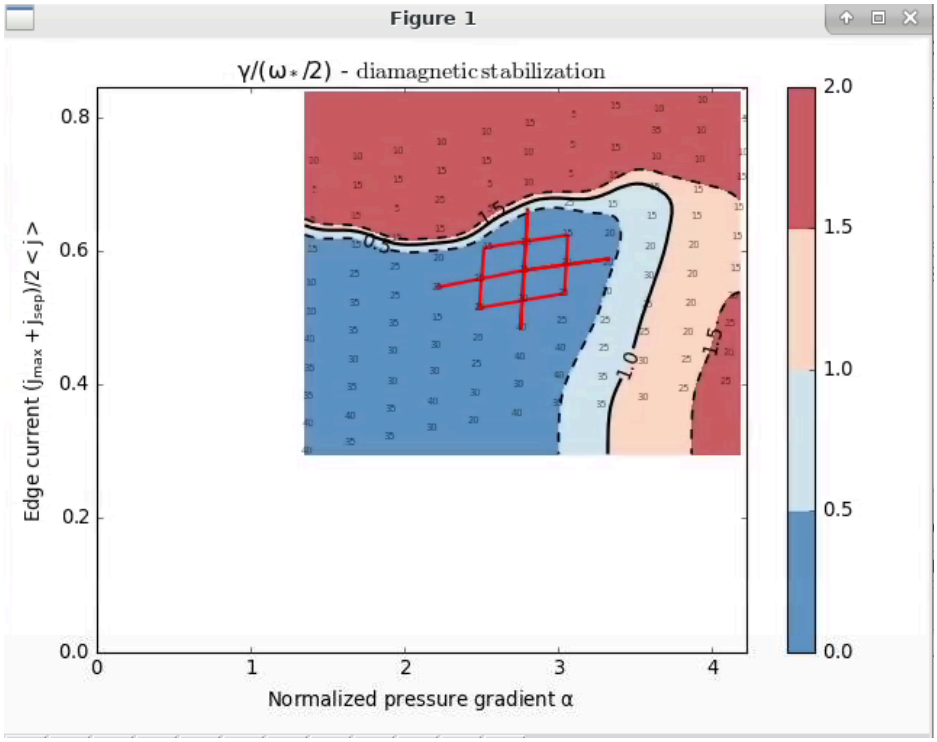
2.5 minutes per elite mode number calculation * number of ELITE modes * number of grid points / number of nodes (20 for iris) = time to run.

In this example 2.5 * (5) * (121) / 20 = 75 minutes.

Finally **Plot ELITE Results**



Output:



Congratulations! Now go Physics!