

Project 1 Writeup

Cricket Bergner

February 12, 2026

1 Attribution

- <https://www.geeksforgeeks.org/python/python-while-loop/>

This was to make sure I was using the correct notation with a while loop.

- <https://www.integral-calculator.com>

To find the correct answer to the integral so I could calculate error.

- https://python4physics.in/program/python/program.php?menu_id=14&submenu_id=2#gsc.tab=0

This helped me figure out how to use existing Python libraries to generate the Legendre polynomials.

- https://matplotlib.org/stable/api/_as_gen/matplotlib.axes.Axes.grid.html

To learn a bit more about adding grids in plots.

- <https://matplotlib.org/stable/users/explain/colors/colors.html>

I wanted to see if I could add custom colors to the lines in plots. Turns out you can!

- https://www.w3schools.com/python/matplotlib_subplot.asp

How to use the subplot function.

2 Timekeeping

The code took around four hours to write.

3 Language, Libraries, and Lessons Learned

3.1 Language

The language for this program was Python.

3.2 Libraries

For the libraries, I used numpy, math, prettytable, scipy, matplotlib, and scipy.special. I really liked prettytable because I thought it gave my plots some character and was relatively easy to look up. The libraries used for this project were great to use; the documentation on them was well written and clearly laid out.

3.3 Lessons Learned

It was good to refamiliarize myself with the different loops, as it has been a while since I worked with them. Making the subplots using a for loop inside of a for loop was also challenging, but good fun, as I liked to think of it as making the elements in a matrix.

4 Important Figures

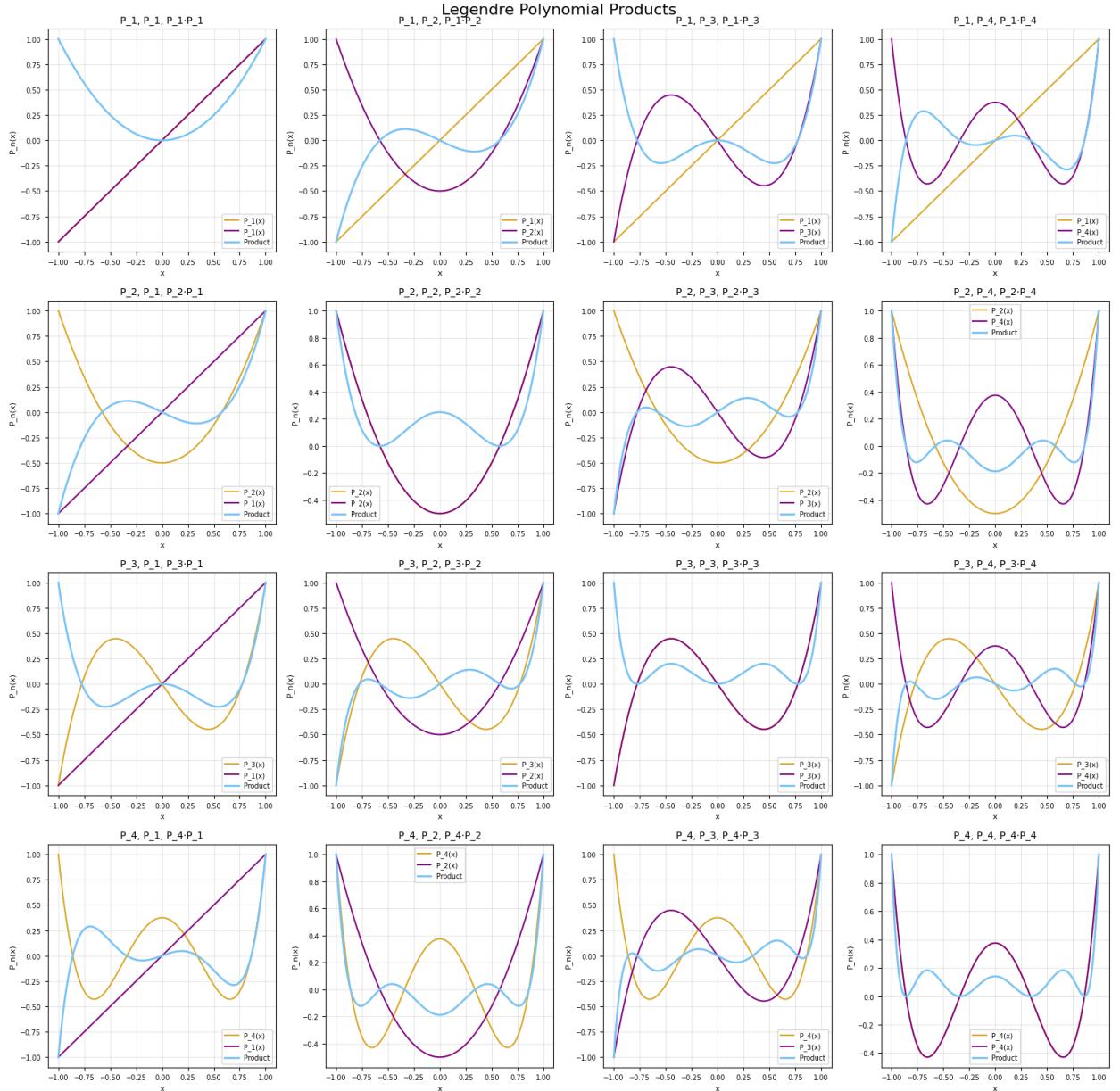


Figure 1: A four by four grid of subplots, each one showcasing P_i , P_j , and $P_i * P_j$, for the column number (i), and row number (j), respectively.