

Use the attached *Mathematica* notebook to play a quick computer game: Guess the Legendre polynomial expansion of a given function, represented by its plot.

Rules:

1. The given function is a linear combination of only three Legendre polynomials (More complicated functions might require an infinite number of Legendre polynomials, but that would make the game hard to code and hard to play!)
2. All of the coefficients happen to be integers (positive or negative).
3. The highest order Legendre polynomial in the linear combination happens to be $P_4(z)$.