Abstract

Abstract: This Halloween-themed discussion/talk is split into two parts. The first is a discussion on the process by which a curve called "the witch of Agnesi" arises. Using this process, we find a function which describes the graph of the witch, and we determine the qualities of the graph which might give one the impression that the curve is "nice". In the second half, the basics of polynomial interpolation is explained, and we soon figure out through applied real analytical tools that it is in fact not a "nice" curve after all. Specifically: we take nodes on the witch of Agnesi whose x-coordinates are equidistant within a closed interval [-5, 5], and find the corresponding Newton polynomial running through these nodes in that interval. As we increases the number of nodes, we see that the vertical error between the curve and the Newton polynomial can get arbitrarily large in the interval [4, 5]. If time permits, we will also see how to choose nodes so that the Newton polynomials uniformly converge to the witch function.