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MATH 174 – B2L

10/10 Excellent!

Problem Set 1.1

a. Interpolation is a specific form of approximation in which all the data points to approximate satisfies the function that is constructed by the interpolation technique. As compared to other approximation techniques which only require to minimize a certain measure of error, interpolation requires to have no or zero errors at the data points. In both techniques, polynomial functions are the most preferred to construct as they're the most convenient to differentiate, integrate, and, in general, perform operations with which are necessary for a wide variety of applications to which approximation or interpolation can be used.
b. Errors in interpolation can be minimized by having more data points or interpolatory abscissas which the interpolatory function can be relative to; but this can only be done to a certain point. Another technique is to choose specific abscissas which will minimize the measure of error that is being considered.
c. The Runge phenomenon is a consequence of increasing the number of interpolatory abscissas which results with an interpolating function that oscillates or wiggles more in its graph, i.e., very quick change in the value and sign of y even on small changes in x-values. This occurs because as the number of interpolatory abscissas are increased, the degree of the algebraic interpolatory polynomial (AIP) also increases which in turn would result to having more roots. The combination of having more roots and a higher degree AIP causes the high and fast oscillations on the graph.
d. In the first half of MATH 174, I learned to appreciate the simplicity and elegance of polynomial functions and how they can be of great use even to complex real world applications. I appreciate more the mathematical rigor that had to be constructed to devise certain theorems which allowed us to use polynomials to its full extent and still analyze while analyzing its drawbacks.
e. My MATH 174 experience has been good so far. I was able to understand how MATLAB is used to solve certain problems while backed up with the knowledge I learned from the course. I find laboratory exercises to be the most challenging with it having only a short period to accomplish but I find this to be okay as it pushes me to be more proficient in programming and in making observations and constructing a write-up based on it.