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CSCI 3236

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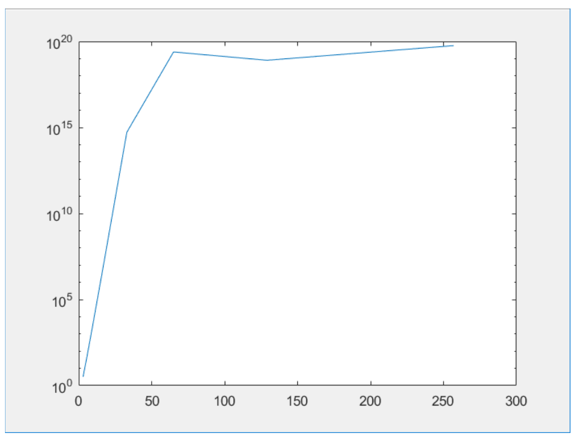
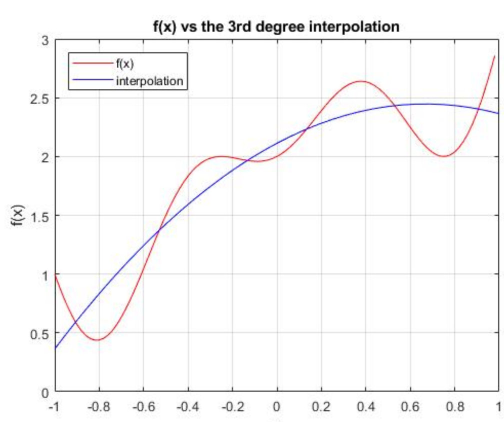
Midterm 1 Take Home

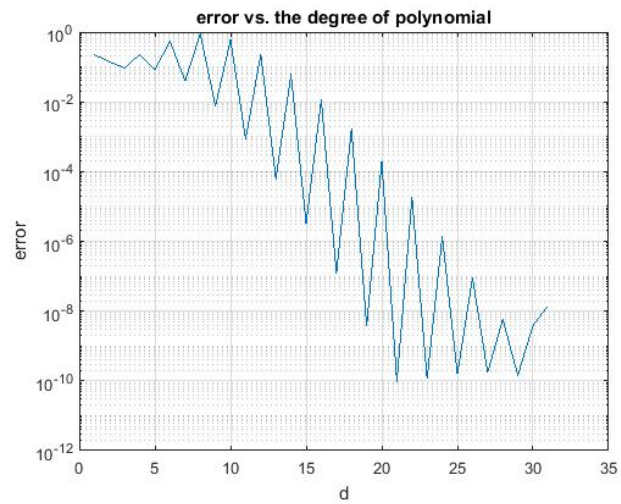
1. No question but verified my vandermonde function and got the desired output.
2. As we increase the values for n, the condition number increases dramatically as well. This vandermonde matrices are – as expected – very ill-conditioned. As we increase *n*, we see a dip at the "sweet spot" in which the matrix becomes slightly better conditioned, but we ultimately see the condition increase again as *n* continues to grow.



3. The polynomial approximation of the 3rd degree was able to show the general trend of the graph as *x* increased. The lack of shape beyond the curve is due to the low degree used in approximating the function. This would become more accurate with higher degrees.



4. As the degree increases we see a drop in the error. This is because with polynomial approximations, the higher the degree, the more inflection points we get to represent the shape of the actual function.



5. This is the graph of condition number (y-axis) and the degree of the polynomial (x-axis). As the degree increases, the condition number increases on a logarithmic scale. This is because the size of our matrix increases with the degree leaving less non-zero entries in the matrix, increasing the number of lost digits.