Spring 2021

Concept 1: Demonstrate the deep relationship of Taylor series to numerical methods such as derivation of methods, error analysis, and order of accuracy.

Concept 2: Depict, interpret, and transform numerical methods to and from various forms such as graphical, pseudo code, and mathematical equation representations.

Concept 3: Ability to monitor, establish and interpret convergence of numerical methods such as understanding pre-specified tolerance, iterations, and step sizes.

Concept 4: Ability to convert a numerical methods problem from a traditional mathematical model into a format suitable for use in an algorithm in problems such as coupled ODEs, matrix representation of equations such as ordinary differential equations, simultaneous linear equations, and nonlinear equations.

Concept 5: Identify all possible solutions or lack thereof for numerical models. What methods to use, which mathematical procedure does it fall under, can the problem be solved at all with what we know as an undergraduate?

Concept 6: Knowing when to invoke a numerical method and which technique is most appropriate. Do we need a numerical method and which one? Would an analytical solution suffice? Does an analytical solution exist?