# ME 345 – HTx Spring 2021 Week 15 Homework

## Problem 1 – Natural Convection of Vertical Flat Plate:

You are to write code in your favorite programming language (EES, MATLAB, MathCAD, Excel, Python, C++, etc.) in order to solve natural convection problems. Your code should compute the following:

* Necessary properties (at the average temperature between the solid and free-stream temperatures)
* Prandtl number
* Rayleigh Number (based on length)
* Beta (coefficient of thermal expansion)
* Coefficients C and n (as necessary)
* Average convection coefficient

Make sure your code has a way to choose or select appropriate values of C and n based on the range of the Rayleigh Number.

## Problem 2 – Natural Convection for Horizonal Cylinder:

You are to write code in your favorite programming language (EES, MATLAB, MathCAD, Excel, Python, C++, etc.) in order to solve natural convection problems. Your code should compute the following:

* Necessary properties (at the average temperature between the solid and free-stream temperatures)
* Prandtl number
* Rayleigh Number (based on diameter)
* Beta (coefficient of thermal expansion)
* Coefficients C and n (as necessary)
* Average convection coefficient

Make sure your code has a way to choose or select appropriate values of C and n based on the range of the Rayleigh Number.