ME I4600 COMPUTATIONAL FLUID MECHANICS Spring 2022
HW #1

Due 5:00pm on February 24, 2022

1. Read the note.

2. (5 pts) Describe the divergence theorem of Gauss.

3. (5 pts) Describe the Taylor-series expansion.

4. (10 pts) Describe the four different models of the flow, and compare the continuity equations derived from these models.

5. (5 pts) What is the difference between the integral and differential forms of the governing equations for fluid flow and heat transfer?

6. (5 pts) What is the difference between the strong and weak conservation forms of the governing equations?

7. (5 pts) What are the Euler equations?

8. (5 pts) What are the complete Navier-Stokes equations?

9. (10 pts) Describe the 3D isothermal incompressible Navier-Stokes equations. Explain the differences between this model and the full system of Navier-Stokes equations. How many unknown variables are in these equations?