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Week 10
Intention
<p>Goal: What do you want to achieve at the end of Week 10?</p> <p>To get a better understanding on heat transfer with a more in-depth explanation on specific scenarios compared to vague concepts.</p>
Desired Outcomes—learning outcomes I want to achieve in MECH 3228
<p>Discuss the topics that seemed most interesting to you and where you anticipate you will use them.</p> <p>To see the applications of fluid mechanics in Heat transfer and show how closely related these topics are with all the scenarios and ways to approach questions.</p>
Self-Understanding—strengths that I can build on and development needs I can address to be successful in MECH 3228
<p>Strengths:</p> <p>My strengths are notetaking and concentrating in class, which will both be very helpful when studying later for tests/assignments.</p> <p>Development Needs:</p> <p>Time management outside of class and organizing it so everything is studied as need be.</p>

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LECTURE CONTENT

Describe the effectiveness-NTU method for heat exchanger analysis.

This method is based on a dimensionless parameter called the heat transfer effectiveness. Must find the capacity rate, and once the effectiveness of the heat exchanger is known, the heat transfer rate can be found and the effectiveness of the heat exchanger depends on geometry of the heat exchanger and the flow arrangement.

What is the effectiveness a function of in all heat exchangers? How about for the HX with capacity ratio of zero?

$$\varepsilon = \frac{\dot{Q}}{\dot{Q}_{\max}} = \frac{\text{Actual heat transfer rate}}{\text{Maximum possible heat transfer rate}}$$

All heat exchangers with $c = 0$

$$\varepsilon = 1 - \exp(-NTU)$$

Based on the heat exchanger plots, which is most effective?

Double pipe flow in counter flow.

What does the selection of heat exchangers depend on?

It depends on heat transfer rate, cost, pumping power, size, weight, type, materials, and miscellaneous like leak tight, safety, reliability and quietness.

Is a medium required for radiation to occur?

No, they can also exist in vacuums.

When do we encounter exchange of energy by radiation?

Temperature is a measure of the strength of photon activities at the microscopic level. The rate of thermal radiation emission increases with increasing temperature. Thermal radiation is continuously emitted by all matter whose temperature is above absolute zero.