Assignment 1 Task 3 explanation

Analysis of custom formula for R=0.5 in

Mass Flow Rate	(kg/s)
pressure_outlet	-1.8939587
velocity_inlet_large	1.5949104
velocity_inlet_small	0.2990469
Net	-1.4007092e-06

Integral energy_balance	
velocity_inlet_small	394813.81
velocity_inlet_large	1971182.2
pressure_outlet	-2365124.2

M*C_p*(T) after integration

M=Mass flow rate

C_p=specific heat

Ex: for V_inlet_small

M*Cp*(T)=0.2990469*4216*(313.15)

394813.7989 w

Analysis of Ansys flux report for R=0.5 in

Mass Flow Rate	(kg/s)
pressure_outlet	-1.8939587
velocity_inlet_large	1.5949104
velocity_inlet_small	0.2990469
Net	-1.4007092e-06

Total Heat Transfer Rate	(w)
pressure_outlet	14709.488
velocity_inlet_large	-33620.754
velocity_inlet_small	18911.719
Net	0.453125

$h=M*C_p*(T-T_{ref}) + H_r$

M=Mass flow rate

C_p=specific heat

T_{ref}=298.15 K

H_r= Radiation Heat Transfer

H_r=0 in our case

Ex: for V_inlet_small

$M*C_p*(T-T_{ref})=0.2990469*4216*(313.15-298.15)$

18911.72596 w