STUDI NUMERIK 2-D PENGARUH PRANDTL NUMBER DAN SUB-CRITICAL REYNOLDS NUMBER TERHADAP KARAKTERISTIK ALIRAN DAN PERPINDAHAN PANAS PADA SINGLE CIRCULAR CYLINDER

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Abstract	The phenomenon of the process of flow and heat transfer in single circular cylinder is the base concept to determine the characteristics of flow and heat transfer in a circular cylinder arranged in a particular pattern , the practical application is widely used in industries such as determining the design arrangement of tube or pipe in the tool of heat tranfer (heat exchangers). The amount of heat transfer when the fluid flow across (cross flow) circular cylinder indicated by the parameter Nusselt number, be it is local Nusselt number (NuÃ•Â¤) and Average Nusselt number (is strongly influenced by the Prandtl number and Reynolds number, where the area in the boundary layer that contribution is very large in the process of heat transfer is a stagnation point at the laminar boundary layer region, reattachment of the shear layer region on the transition boundary layer and periodic vortex flow region (turbulent boundary layer) in the region wake. Fluid flow phenomena and periodic vortex flow region accompanied by the occurrence of vortex shedding and Karman vortex street. The method used in this research is the study of numerical 2-D unsteady RANS (Reynolds-averaged Navier Stokes), using simulation analysis SST k-Ã•Â‰ turbulence models in software CFD FLUENT to obtain data relating to the characteristics of fluid flow and heat transfer. Validation of numerical use grid independence according to Nusselt number of experimental results and the results of calculations using the empirical correlation equation. Numerical studies showed significant results that the Nusselt number is influenced by the value of Reynolds number and Prandtl number and can be used as a basis concept for studying the mechanism of the phenomenon of the concept of flow and heat transfer tube banks of heat exchangers. Value of local Nusselt number (NuÃ•Â¤) numerical simulation results increased with increasing Reynolds number and Prandtl number, where NuÃ•Â¤ = 21.55 up to NuÃ•Â¤ = 128.2, and from NuÃ•Â¤ = 21.55 up to NuÃ•Â¤ = 598.76. Keywords: Nusselt number Prandtl number, Reynolds number, 2-D unsteady RANS, SST k-Ã•Â‰ turbulence model
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