

ABSTRACT

Oil and gas is a non-renewable energy source. Needs of oil and gas used in power plants and factories as a source of energy. So many buildings, residential and factory use that energy as air conditioning systems and engine fuel. We do not know until when this non-renewable energy is available, therefore it is necessary to search for renewable energy. In this thesis the author will examine renewable energy, namely, thermal energy storage using materials that have been examined in previous studies, using the finite volume method to create a numerical simulation of PCM-based nanofluid with paraffin material. This method is a numerical scheme of finite volume method. Numerical simulations will be produced in the form of temperature distribution and thermal energy storage performance.

The final task is to produce numerical simulations for thermal energy storage using Phase Change Material (PCM) based nanofluid. Heat conduction equation model on Phase Change Materials in cylindrical coordinates. With the method of finite volume in this thesis can be generated numerical solutions for thermal energy storage. The results obtained numerical solution that will be converted into C ++ programming language to determine the performance of temperature distribution and total energy on Phase Change Materials. Based on temperature distribution with a time of 8 hours can melt the PCM to $r = 1.84$. This shows that the simulations in this thesis a little slower than with previous studies [6].

Keyword: Nanofluids, PCM, Latent Heat, Enthalpy.