

ABSTRACT

Solar cells are solar-powered power plants that are environmentally friendly and can be used as a solution to future electricity crises. Solar cells, or photovoltaic cells (PV), are made of semiconductor materials. If the material gets photon energy, then the electrons will be freed from the atomic bond and will move freely so that the electrical voltage of the current is generated.

One of the factors that can affect the performance of solar panels in addition to solar radiation and the environmental conditions around the panel is temperature. Solar panels will receive the heat that comes from sun radiation and thus cause the temperature on the panel to rise above the recommended optimal temperature values, and this condition causes the performance and efficiency of the solar cell to fall drastically.

In this study, the authors designed a water-based cooling system to optimize the temperature value of the solar panel to reach the recommended optimal temperature and also applied the intelligent control system to the cooling systems to maintain temperature stability and also to be able to adjust the pump used as an actuator in the refrigeration system.

By keeping in mind the irradiance value of the sun and also the temperature of the solar panel, the pump output can be adjusted in such a way that the energy use of the pump used can be minimized and the efficiency objective of the output of solar panels can be achieved.

Keywords: photovoltaic, intelligent control systems, solar panels, cooling systems.