Numerical Analysis of PEM Fuel Cell

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Abstract. Fuel cells are low emission devices that are able to produce electric energy by an electrochemical process involving fuel and oxidant. PEM fuel cell is a specific type of fuel cell that uses hydrogen as fuel and oxygen from ambient air as oxidant. Their attributes make them convenient technology to be used as stationary plants or for powering electric vehicles. This work focuses on numerical simulations and analysis of PEM fuel cell with curved gas channels. Discretization of the PEM fuel cell was performed in ANSYS ICEM CFD. The simulations themselves were carried out in ANSYS Fluent. The analysis consists in evaluating field distributions of various physical quantities. The results obtained from the simulations of PEM fuel cell with curved gas channels confirm the theoretical knowledge in this field concerning the field distributions of physical quantities such as velocity, pressure and current flux density.