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The electrodiffusion is a non-linear transport process generated by two physical phenomena: diffusion and electrical activity of ions. The mathematical model is built up from the Poisson-Nernst-Planck (PNP) equations. Nowadays, the applications of this theory go of classic chemical and electrochemistry engineering, until technologies of the environment as desalination and alternative power as fuel batteries as well as biotechnology, biomedical engineering and micro-electro-mechanical systems, among others. In this poster will be presented the numerical solutions of the PNP equations for some simplification cases on fuel cells. These numerical solutions were obtained from an iterative algorithm using the finite element method, for several ionic species interacting in a fuel cell. (Received May 06, 2013)