1086-35-530 **Weishi Liu** (wliu@math.ku.edu), 405 Snow Hall 1460 Jayhawk Blvd, Lawrence, KS 66045, **Xuemin Tu** (xtu@math.ku.edu), 405 Snow Hall 1460 Jayhawk Blvd, Lawrence, KS 66045, and **Mingji Zhang*** (mingjizhang@math.ku.edu), 405 Snow Hall 1460 Jayhawk Blvd, Lawrence, KS 66045. *Pitch-fork bifurcation of a steady-state Poisson-Nernst-Planck systems for ion channels with permanent charge: Multiple I-V relations.*

We consider a one-dimensional Poisson-Nernst-Planck(PNP) model for ionic flow through ion channels for two ion species with permanent charges. The PNP model problem can be viewed as a boundary value problem of a singularly perturbed system and the existence of solutions is reduced to that of an algebraic system. Multiple solutions are shown to exist, under some conditions, through bifurcation analysis and numerical computations are consistent with our analysis. Existence of multiple solutions in such or similar models might be relevant to complex behaviors of ion channels. (Received September 05, 2012)