

Quasineutral limit of a standard drift diffusion model for semiconductors

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Abstract: The limit of vanishing Debye length (charge neutral limit) in a nonlinear bipolar drift-diffusion model for semiconductors with pn-junction (i.e. with a bipolar background charge) is studied. The quasineutral limit (zero-Debye-length limit) is performed rigorously by using the so-called entropy functional which yields appropriate uniform estimates and the compactness argument.

Keywords: Quasineutral limit, nonlinear drift-diffusion equations, entropy method

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