

Numerical schemes for the drift-diffusion system : study of the stability at the quasi-neutral limit

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Drift-diffusion systems are well-known and widely used for the modeling of semiconductor devices. The rescaled Debye length λ generally occurs in the scaled systems; it measures the typical scale of electric interactions in the semiconductor. When designing schemes for the drift-diffusion systems, it is relevant to design schemes that are applicable for any value of λ : they should converge for any value of $\lambda \geq 0$ and remain stable at the quasi-neutral limit $\lambda \rightarrow 0$. In this talk, we will prove that the Euler backward in time and finite volume in space scheme, with a Scharfetter-Gummel approximation of the convection-diffusion fluxes, satisfies these properties.

This work is in collaboration with Marianne Bessemoulin-Chatard (Nantes) and Marie-Hélène Vignal (Toulouse), see [1].

Acknowledgments: This work was supported by the Labex CEMPI (ANR-11-LABX-0007-01) and by INRIA Lille Nord Europe (Team Mephysto).

REFERENCES

- [1] M. Bessemoulin-Chatard, C. Chainais-Hillairet, and M.-H. Vignal, Study of a finite volume scheme for the drift-diffusion system. Asymptotic behavior in the quasi-neutral limit. *SIAM J. Numer. Anal.* **52**-4 (2014), 1666–1691.