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A NOVEL NUMERICAL METHOD FOR A CELL DWARFISM MODEL

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We analyze, from a numerical point of view, a cell population balance model (CPBM) in which cells are distinguished by their cell-size. The CPBM we consider is based upon the model developed by Diekmann, Heijmans and Thieme [1] and studied theoretically in [2]. In this model, cells grow exponentially. The usual CPBM, as developed in [1], assumes the existence of a minimal cell size $a > 0$ for cellular division to take place which generates a minimal cellular size $a/2$. However, the model we study allows cell of any size in the interval $(0, 1]$ to divide. In this work, we present and analyze a first-order semi-lagrangian scheme which is specially adapted to obtain the solution to the problem.

References

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- [2] K. H. Howard. (2001). *A size-structured model of cell dwarfism*, Disc. Cont. Dyn. Sys. B 1 471–484.