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A CLASS OF INITIAL-BOUNDARY VALUE PROBLEMS GOVERNED BY PSEUDO-PARABOLIC WEIGHTED TOTAL VARIATION FLOWS *

Dedicated to Professor Nobuyuki Kenmochi on the occasion of his 77th birthday

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Abstract. In this paper, we consider a class of initial-boundary value problems governed by pseudo-parabolic total variation flows. The principal characteristic of our problem lies in the velocity term of the diffusion flux, a feature that can bring about stronger regularity than what is found in standard parabolic PDEs. Meanwhile, our total variation flow contains singular diffusion, and this singularity may lead to a degeneration of the regularity of solution. The objective of this paper is to clarify the power balance between these conflicting effects. Consequently, we will present mathematical results concerning the well-posedness and regularity of the solution in the Main Theorems of this paper.

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