

Study of a family of higher order nonlocal degenerate parabolic equations

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We study a nonlocal degenerate parabolic equation of order $\alpha + 2$ for $\alpha \in (0, 2)$. The equation is a generalization of the one arising in the modeling of hydraulic fractures studied by Imbert and Mellet in 2011. Using the same approach, we prove the existence of solutions for this equation for $0 < \alpha < 2$ and for nonnegative initial data satisfying appropriate assumptions. The main difference is the compactness results due to different Sobolev embeddings. Furthermore, for $\alpha > 1$, we construct a nonnegative solution for nonnegative initial data under weaker assumptions.

REFERENCES

- [1] R. Tarhini, *Study of a family of higher order nonlocal degenerate parabolic equations: from the porous medium equation to the thin film equation*. J. Differential Equations 259 (2015), pp. 5782-5812.
- [2] C. Imbert and A. Mellet, *Existence of solutions for a higher order non-local equation appearing in crack dynamics*. Nonlinearity, 24 (2011), pp. 3487-3514.