

Nonlocal heat equations with generalized fractional Laplacian

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Let us consider initial-boundary value

$$u_t + g(-\Delta)u = f(t, x, u), \quad u(t, \cdot)|_{\partial\Omega} = 0, \quad u(0, \cdot) = u_0, \quad (1)$$

where $g(-\Delta)$ is the generalized fractional Laplacian, which is defined by spectral theorem (compare in [1]).

We aim to show that the problem (1) has a solution. To obtain the existence of solution we use two methods:

- direct method, which relies on using Fourier series;
- semigroup method.

Moreover, we present some numerical simulations of solutions to our problem. Above results was obtained by using Python.

REFERENCES

- [1] I. Kossowski, B. Przeradzki, Nonlinear equations with a generalized fractional Laplacian, *Rev. R. Acad. Cienc. Exactas Fis. Nat.* **115** (2), **115**, art. **58** (2021), 1-13.