A Fractional Diffusion Model for Dispersal of Airborne Seeds and Operator Splitting

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Experimental data from biology indicates that the concentration of airborne seeds during the dispersal process posesses a heavy tailed distribution. We propose a time-continuous model based on Fisher's equation where the regular diffusion is replaced by a fractional one. Our results show that the sequential operator splitting approximation method for this equation coincides with some of the discrete-time models used by biologist to describe invasion of species such as seeds. Based on an operator semigroup framework we also give upper and lower pointwise bounds on the solution of the continuous model using the sequential splitting approximation method.