Fractional diffusion equation

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We study space– and time–fractional diffusion equations. Our approach strongly depends on the fractional Sturm–Liouville theory, precisely on the problem of finding eigenvalues and corresponding eigenfunctions to the certain fractional differential equation. Using the method of separating variables and applying theorem ensuring existence of solutions to the fractional Sturm–Liouville problem we solve several types of fractional duffusion equations.