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Type: **Invited talk**

Analysis of fractional Cauchy problems with some probabilistic applications

Thursday, 24 September 2026 15:00 (30 minutes)

In this talk we give an explicit solution to Dzherbashyan-Caputo-fractional Cauchy problems related to equations with derivatives of order ν_k , for k non-negative integer and $\nu > 0$. The solution is obtained by connecting the differential equation with the roots of the characteristic polynomial and it is expressed in terms of Mittag-Leffler-type functions. Under some additional hypothesis, the solution can be expressed as a linear combination of Mittag-Leffler functions with common fractional order ν . We establish a probabilistic relationship, involving the inverse of stable subordinator, between the solutions of differential problems with order α_ν and ν , for $\alpha \in (0, 1)$.

Finally, we use the described method to solve fractional differential equations arising in the fractionalization of partial differential equations related to the probability law of planar random motions with finite velocities.

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