N.Ratanov (Chelyabinsk State University, Russia), **On fractional Kac-Ornstein-Uhlenbeck processes.** [1] Fractional Kac-Ornstein-Uhlenbeck process $X^{(\alpha)}(t)$ is determined by the equation

$$X^{(\alpha)}(t) = x - \beta \int_0^t X^{(\alpha)}(s)\mathrm{d}s + \mathcal{F}^{(\alpha)}(t), \qquad t \geq 0, \tag{1}$$

where $\mathcal{F}^{(\alpha)}(t)$ is a fractionally integrated telegraph process,

$$\mathcal{F}^{\alpha}(t) = I^{\alpha}[c_{\varepsilon(\cdot)}](t) = \frac{1}{\Gamma(\alpha)} \int_0^t (t-s)^{\alpha-1} c_{\varepsilon(s)}\mathrm{d}s, \qquad c_0 > c_1, \quad 0 < \alpha \leq 1,$$

Theorem 1. *The solution $X^{(\alpha)}(t)$ of (1) has the form:*

$$X^{(\alpha)}(t) = x\mathrm{e}^{-\beta t} + \int_0^t K_\alpha(t-s)c_{\varepsilon(s)}\mathrm{d}s,$$

where

$$K_\alpha(t) = \frac{t^{\alpha-1}}{\Gamma(\alpha)}\,{}_1F_1(1,\alpha;-\beta t) = \frac{t^{\alpha-1}\mathrm{e}^{-\beta t}}{\Gamma(\alpha)}\,{}_1F_1(\alpha-1,\alpha;\beta t), \qquad \alpha \in (0,1], \quad \beta > 0.$$

Here ${}_1F_1$ is the confluent hypergeometric Kummer function.

Explicit expressions for the moments of $X^{(\alpha)}(t)$ are obtained. Limit theorems for various scalings are derived.

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limit

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