Ryazantsev M.Yu. (Voronezh State University, Voronezh, Russia). **An algorithm for numerical simulation of the mean derivative.**

In this paper, we study the problem of constructing a stable algorithm that simulates sample trajectories of the current velocity of a stochastic process in terms of mean derivatives. A theoretical justification of the algorithm is given, and examples of its use are provided.

Let a stochastic process $\xi(t)$ in $\mathbb{R}^n$ be defined on some probability space $(\Omega, \mathcal{F}, \mathsf{P})$. The vector $v^\xi(t) = v^\xi(t, \xi(t)) = D_S \xi(t)$ is called the current velocity of the process $\xi(t)$.

Let $Y = \dfrac{\xi(t + \Delta t) - \xi(t)}{\Delta t}$, $X = \xi(t)$. For a given sample trajectory at time t, we have a value x. Define the function $m(x) = E(Y \mid X = x)$.

Theorem 1. *To obtain a sample trajectory of the current velocity of the process ξ, it is necessary to compute the quantity $m(x)$ for all possible values of some sample trajectory ξ. Moreover, the following approximation holds:*

$$m(x) \approx \frac{\sum_{i=1}^n K_h(x - x_i) y_i}{\sum_{j=1}^n K_h(x - x_j)}, \tag{1}$$

where x_i, y_i are numerical realizations of the processes X, Y on some grid partitioning the interval $[0, T]$. K_h is a weighted statistical kernel, chosen empirically.