# Solution of Randomness, Uniformity and Independence Problems by Congruent Operator

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It is proved in works [1,2] that the randomness problem does not solved outside concept of the restriction principle. The congruent operator of densities convolution $p_i^{(n)}$ is considered in [2]. It describes the vector summation modulo 1

$$\underset{i=1}{\overset{m+1}{\{*\}}}\ p_i^{(n)} = p_{(m)}^{(n)} \ : \qquad z_{(m)}^{(n)} \ \equiv \ \left\{ \sum_{i=1}^{m+1} y_i^{(n)} \right\} (\mathrm{mod}\, 1)\,, \quad y_i^{(n)} = \left( x_i^{(1)},\, x_i^{(2)}\,, ...,\, x_i^{(n)} \right)\,, \qquad (1)$$

where the summation is coordinatewise. The convolution $p_{(m)}^{(n)}$ for values $z_{(m)}^{(n)}$ converges rapidly to an uniform distribution $\|p_{(m)}^{(n)} - 1\| \overset{m\to\infty}{\Longrightarrow} 0$ in norms of standard spaces.

**Theorem 1.** Increase of parameter $m$ of congruent summation in (1) brings to growth of pseudorandomness measure of resulting vectors $z_{(m)}^{(n)}$.

**Theorem 2.** Only unlimited increase of parameter $m = \infty$ in expression (1) ensures a creation of random values and hence generation of randomness.

**Theorem 3.** Opportunity of numerical modelling of an arbitrary pseudorandomness measure signifies solution of randomness, multivariate uniformity and independence problems.

[1] M.V. Antipov. *The Restricton Principle*, Ross.Akad.Nauk, Novosibirsk, 1998, 444 p.

[2] M.V. Antipov. Congruent Operator in Simulation of Continuous Distributions, *Comp. Math. and Math. Phys.*, Moscow, Vol. **42**, N 11, 2002, pp. 1572 - 1580.