Several fractional integral inequalities for symmetrized convex stochastic processes

Nurgul Okur[1],Nazan Ocak[2]

[1] *Department of Statistics, Giresun University, Turkey*

nurgul.okur@giresun.edu.tr

[2] *Institute of Science, Giresun University, Turkey*

nazannocak@hotmail.com

Abstract: In this study, a stochastic process $S : [\theta, \delta] \times \Sigma \to \mathbb{R}$ $(\theta < \delta)$ is introduced symmetrized convex on the interval $[\theta, \delta]$, if the symmetrical stochastic transform $\widetilde{S}$ which is defined by

$$\widetilde{S} := \frac{1}{2}\left[S(\omega, \cdot) + S(\theta + \delta - \omega, \cdot)\right], \omega \in [\theta, \delta] \tag{1}$$

is convex on $[\theta, \delta]$. Then, the authors obtain the Hermite-Hadamard type inequalitiy via fractional integral operators for these processes, as follows:

$$S\left(\frac{\theta+\delta}{2}, \cdot\right) \leq \frac{\Gamma(\alpha+1)}{2(\delta-\theta)^{\alpha}}\left[I^{\alpha}_{\theta+}S(\delta, \cdot) + I^{\alpha}_{\delta-}S(\theta, \cdot)\right] \leq \frac{S(\theta, \cdot) + S(\delta, \cdot)}{2}. \tag{2}$$

Moreover, the related results of the above inequality is verified in this study.

Keywords: Symmetric-convexity; stochastic process; mean-square integral; Hermite-Hadamard inequality, fractional intagral operator.

2010 Mathematics Subject Classification: 26D15, 26D99, 26A51, 46N10.

References

[1] S. S. Dragomir, Symmetrized convexity and Hermite-Hadamard type inequalities, Journal of Mathematical Inequalities, vol. 10, no 4, 901–918, 2016.

[2] E. Set and A. Gozpınar, Some new inequalities involving generalized fractional integral operatorsfor several class of functions, AIP Conf. Proc., vol. 1833 no 1, p:020038, 2017.