

## INEQUALITY FOR THE VARIANCE OF AN ASYMMETRIC LOSS

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*Abstract.* We assume that the forecast error follows a probability distribution which is symmetric and monotonically non-increasing on non-negative real numbers, and if there is a mismatch between observed and predicted value, then we suffer a loss. Under the assumptions, we solve a minimization problem with an asymmetric loss function. In addition, we give an inequality for the variance of the loss.

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### REFERENCES

- [1] ALEX DYTISO, RONIT BUSTIN, H. VINCENT POOR AND SHLOMO SHAMAI, *Analytical properties of generalized Gaussian distributions*, Journal of Statistical Distributions and Applications, **5** (1): 6, Dec 2018.
- [2] SARALEES NADARAJAH, *A generalized normal distribution*, Journal of Applied Statistics, **32** (7): 685–694, 2005.
- [3] TH. SUBBOTIN, *On the law of frequency of error*, Recueil Mathématique, **31**: 296–301, 1923.
- [4] NAOYA YAMAGUCHI, MAIYA HORI AND YOSHINARI IDEGUCHI, *Minimising the expectation value of the procurement cost in electricity markets based on the prediction error of energy consumption*, Pac. J. Math. Ind., **10**: Art 4, 16, 2018.
- [5] NAOYA YAMAGUCHI, YUKA YAMAGUCHI AND RYUEI NISHII, *Minimizing the expected value of the asymmetric loss function and an inequality for the variance of the loss*, Journal of Applied Statistics, **48** (13–15): 2348–2368, 2021, PMID: 35707067.