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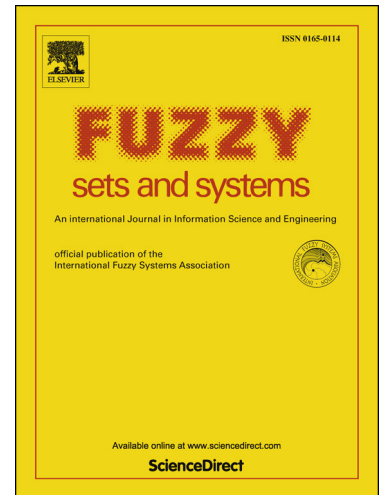
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# On risk aversion under fuzzy random data

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## Abstract

In this paper, we generalize classical results on risk aversion by analyzing the case, when the available data about cash flows are fuzzy numbers, random fuzzy numbers, type-2 fuzzy sets, random type-2 fuzzy sets etc. We prove that the Arrow-Pratt measures are also risk aversion measures when an agent measures her risk using the Jensen-type operators. We also provide numerous examples of the Jensen-type operators.

*Keywords:* Risk aversion; Measures of risk aversion; Fuzzy sets; Random fuzzy sets; Type-2 fuzzy data; Jensen-type operator.

## 1 Introduction

Consider an agent with initial wealth  $w \geq 0$ . Assume that the agent wants to buy an insurance contract which pays out the monetary equivalent of random outcome  $X$ . If she decides to buy the contract for some premium  $\pi$ , then her eventual wealth is  $w - \pi$  (she pays  $\pi$  for the insurance, but if the loss of random value  $X$  occurs, then it will be reimbursed by an insurance company and it does not influence the wealth). On the other hand, if she decides not to buy the insurance, her wealth is  $w - X$ . In this background,  $X$  may be a random variable which takes both positive values, which describe the magnitude of the loss, and negative values, which means that there is a possibility of yielding a gain from investment. The latter option is sensible if we study insurance products such as variable annuities or investment-linked life insurances. This means that  $w - X$  can take any real value.

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