Structural properties of probability constraints

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A probability function results from a measure acting on a random inequality system depending both on a decision and random vector. Probability constraints requests that such a system holds with high enough probability in order to ensure safety of the decision. In this talk we will discuss recent insights concerning differentiability of probability functions, but too new insights on convexity of feasible sets for probability constraints. The discussed results cover nonlinear systems as well as elliptically distributed random vectors.

References

[1]   W. van Ackooij and R. Henrion ; Gradient formulae for nonlinear probabilistic constraints with Gaussian and Gaussian-like distributions ; SIAM Journal on Optimization 24 (4) ; 1864-1889 ; 2014

[2]   W. van Ackooij and R. Henrion ; (Sub-) Gradient formulae for probability functions of random inequality systems under Gaussian distribution ; SIAM Journal on Uncertainty Quantification ; 5 (1) ; 63-87 ; DOI 10.1137/16M1061308 ; 2017