

Research Interests of Francesca Maggioni

My research interests regard the area of Optimization under Uncertainty for sequential problems with comparison among different methodologies like Stochastic Programming, Robust Optimization and Distributionally Robust Optimization.

From a methodological point of view, my work has been focused on developing different types of approximations for multistage mixed integer stochastic programs with risk measures which are usually intractable as they are originally defined: in the works [1]-[2]-[3] bounds have been proposed for a large unsolvable discrete tree model, by solving many much smaller problems instead of the big one associated to the large discrete scenario tree. In [4] guaranteed bounds for the general infinite stochastic program are provided based on stochastic dominance and subgradient approximations.

Current research in this context is based on developing bounds for joint chance-constrained programs [5], for multi-horizon stochastic programs [6] and optimized chain of bounds by scenario grouping in stochastic programming [7].

Other contributions in the area of stochastic programming and robust optimization are:

- Evaluation of the quality of the expected value solution in stochastic programming [8]-[9];
- Partial Benders decomposition for 2-stage stochastic integer programming [10];
- Evaluation of the sample complexity for multistage robust optimization problems [11];
- Worst-case analysis of the rolling horizon approach in stochastic programming [12];
- Evaluation of the value of the right distribution in stochastic programming [13].

The applications considered in this area include logistics and transportation [14]-[15]-[16]-[17]-[18], energy [19]-[20]-[21], mobile ad-hoc network [22]-[23] and pension systems [24]. Current applications interests are in developing stochastic optimization models for bike-sharing systems [25]-[26], in analyzing policies in an energy storage problem [27] and in providing a distributionally robust optimization model for a defined benefit pension fund problem [28].

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