# Discrete Conditional Value-at-Risk for the Makespan in Temporal Networks Under Imperfect Information

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We address the issue of evaluate the discrete conditional value-at-risk (CVaR) for the makespan in scheduling problems represented through temporal networks under incomplete uncertainty information. The literature shows how the CVaR of the makespan as a criterion for stochastic scheduling problems has the tendency of simultaneously reducing both the expectation and variance of the completion time. In this regard, it offers some advantages over more traditional nonlinear expectation-variance-based approaches. We consider general scheduling problems and their temporal network representation under uncertainties related to the processing times. For these uncertainties only incomplete or imperfect information are available. More precisely, for each activity only the interval for its integer valued duration is known to the scheduler. We propose a method to exactly evaluate the discrete CVaR associated to a feasible schedule demonstrating its application for some machine scheduling problems. Moreover, we also propose some lower and upper bounds to determine a fast estimation of the CVaR of the makespan. The results enable to exploit the benefits and effectiveness of using the CVaR criterion in wide classes of scheduling methodologies to consider risk-aversion for stochastic scheduling problems that often arise in different practical contexts.