Adaptivity in combinatorial optimization problems

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We consider a variety of packing integer programs where the input is stochastic. The solution is obtained by a policy and it is a process of increasing the decision variables one by one, until the last feasible solution is obtained and returned as the output of the policy. We consider both adaptive policies (that can make dynamic decisions based on the instantiated values regarding the decision variables which the policy increases so far) and non-adaptive policies (that do not use this type of information). Our work characterizes the benefit of adaptivity. For this purpose we follow Dean et al. and use a measure called the adaptivity gap: the supremum over instances of the ratio between the expected value obtained by an optimal adaptive policy and the expected value obtained by an optimal non-adaptive policy.