

Title: Describing Parameterized Complexity Classes

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Abstract: We describe parameterized complexity classes by means of classical complexity theory and descriptive complexity theory. For every classical complexity class we introduce a parameterized analogue in a natural way. In particular, the analogue of polynomial time is the class of all fixed-parameter tractable problems. We develop a basic complexity theory for the parameterized analogues of classical complexity classes and give, among other things, complete problems and logical descriptions. We then show that most of the well-known intractable parameterized complexity classes are not analogues of classical classes. Nevertheless, for all these classes we can provide natural logical descriptions.

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