Relative Randomness and Descriptional Complexity

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In Algorithmic Information Theory, we use the concept of minimal description length to define the complexity. The unified complexity theory uses the dual measure for defining the complexity of an object relative to a class of algorithms, so the length is just one possible measure for objects. To further define randomness, we need additional properties of the encoding, such that together with the measure, it will form an Encoded Blum Static Complexity Space. This presentation discusses aspects of this approach in the case of the classes of algorithms without the universality property, and analyzes ways and gives examples to address the possible issues. In particular, the focus will be on the descriptional complexity of finite transducers and regular languages.

Mark Burgin:Algorithmic complexity of recursive and inductive algorithms. Theor. Comput. Sci. 317(1-3): 31-60 (2004)

Cezar Câmpeanu:What is a Complex Regular Language? J. Autom. Lang. Comb. 23(1-3): 111-126 (2018)

Cezar Câmpeanu:Descriptional Complexity in encoded Blum Static Complexity Spaces. Int. J. Found. Comput. Sci. 25(7): 917- (2014)