

Seminário OGTC

Optimization, Graph Theory and Combinatorics

20 de novembro de 2019
(15h00–16h00 — Sala 11.3.21)

Complex distributions emerging in filtering and compression

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Resumo

In filtering, each output is produced by a certain number of different inputs. We explore the statistics of this degeneracy in an explicitly treatable filtering problem in which filtering performs the maximal compression of relevant information contained in inputs (arrays of zeros and ones). The filter patterns in this problem conveniently allow a combinatorial consideration. This allows us to find the complex statistics of outputs, namely the exact distribution of output degeneracies, for arbitrary input sizes. We observe that the resulting degeneracy distribution of outputs decays as $e^{-c \log^\alpha d}$ with degeneracy d , where c is a constant and exponent $\alpha > 1$, i.e. faster than a power law. We applied various filter patterns to the inputs and showed that the shortest one produces the most informative representations of the inputs. The explicit solution of the problem is based on ideas from number theory.

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