

1135-28-2385

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Exploiting Algorithmizable Mathematical Structure Theorems To Represent Data. Preliminary report.

A fundamental issue in data science is reproducibility of analytical results. Exploiting algorithmizable mathematical structure theorems to represent data promises to improve reproducibility. In this short talk I'll present this idea by illustrating use of the Singular Value Decomposition Theorem from Linear Algebra to represent multi-scale geometric structure and use of a Lemma originally due to Fefferman, Kenig and Pipher to represent data as multiscale non-parametric measures. Since this second representation is a recursive binary tree structure it can be easily accessible to undergraduates. I'll summarize examples of undergraduate and short masters level projects and a recent project with a Women in Science of Data and Mathematics group. (Received September 26, 2017)