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Analysis of partisan gerrymandering tools in advance of the US 2020 census. Preliminary report.

Over the last decade, mapmakers have precisely gerrymandered political districts for the benefit of their party. In response, political scientists and mathematicians have more extensively investigated tools to quantify and understand the mathematical structure of redistricting problems. Two primary tools for determining whether a particular redistricting plan is fair are partisan-gerrymandering metrics and stochastic sampling algorithms. In this work we explore the Declination, a new metric intended to detect partisan gerrymandering. Within our analyses, we show that Declination cannot detect all forms of packing and cracking, and we compare the Declination to the Efficiency Gap. We show that these two metrics can behave quite differently, and give explicit examples where that occurs. (Received August 05, 2019)