

# Combinatorial conditions for $\mathbf{P} < \mathbf{NP}$ and $\mathbf{NP} = \mathbf{coNP}$

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Complex structure of DNF tautologies yields plausible combinatorial approximations of (i.e., sufficient conditions for) both famous conjectures  $\mathbf{P} < \mathbf{NP}$  and  $\mathbf{NP} = \mathbf{coNP}$ . To this end we use

1. to treat the case of  $\mathbf{NP} = \mathbf{coNP}$ : natural translation of an appropriate cutfree proof theoretic interpretation.
2. to treat the case of  $\mathbf{P} < \mathbf{NP}$ : “school-algebra” conversions that arise from nontrivial analytic considerations of boolean-valued Borel polynomials.

First presentation provides a general framework for this research and outlines its combinatorial background. Second presentation goes into more detail and specifies basic methods and (partial) verifications of the conditions obtained.