

# ***Title:*** Fixed-Point logics on planar graphs

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***Abstract:*** We study the expressive power of inflationary fixed-point logic IFP and inflationary fixed-point logic with counting IFP+C on planar graphs. We prove the following results:

- (1) IFP captures polynomial time on 3-connected planar graphs, and IFP+C captures polynomial time on arbitrary planar graphs.
- (2) Planar graphs can be characterized up to isomorphism in a logic with finitely many variables and counting. This answers a question of Immerman.
- (3) The class of planar graphs is definable in IFP. This answers a question of Dawar and Grädel.