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How Not to Characterize Planar-emulable Graphs

Content :

We investigate the question of which graphs have planar emulators (a locally-surjective homomorphism from some finite planar graph)--a problem raised already in Fellows' thesis (1985) and conceptually related to the better known planar cover conjecture by Negami (1986). For over two decades, the planar emulator problem lived poorly in a shadow of Negami's conjecture--which is still open--as the two were considered equivalent.

But, in the end of 2008, a surprising construction by Rieck and Yamashita falsified the natural "planar emulator conjecture", and thus opened a whole new research field. We present further results and constructions which show how far the planar-emulability concept is from planar-coverability, and that the traditional idea of likening it to projective embeddability is actually very out-of-place. We also present several positive partial characterizations of planar-emulable graphs.

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