

Almost all 5-regular graphs have a 3-flow

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Tutte conjectured in 1972 that every 4-edge connected graph has a nowhere-zero 3-flow. This has long been known to be equivalent to the conjecture that every 5-regular 4-edge-connected graph has an edge orientation in which every out-degree is either 1 or 4. Using the small subgraph conditioning method of Robinson and Wormald, we show that the assertion of the conjecture holds asymptotically almost surely for random 5-regular graphs. It follows that the conjecture holds for almost all 4-edge connected 5-regular graphs.