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H-colouring trees. Preliminary report.

All trees on n vertices admit the same number of proper q -colourings. But if we broaden our viewpoint a little, and consider, for each graph H , the number of H -colourings admitted by an n -vertex tree, we quickly reach a realm of open questions. [An H -colouring of a graph G is an adjacency-preserving map from the vertices of G to those of H ; when H is the complete graph on q vertices, H -colouring and proper q -colouring coincide.]

Siderenko resolved the question of which n -vertex tree admits the greatest number of H -colourings. We describe a new proof of Siderenko's result (valid for large n) that admits extensions beyond the world of trees. In the other direction, we describe some progress on the fairly open question of determining which n -vertex tree admits the least number of H -colourings, extending a result of Prodinger and Tichy. (Received January 10, 2015)