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ALMOST ALL OPTIMALLY COLOURED COMPLETE GRAPHS CONTAIN A RAINBOW HAMILTON PATH

A subgraph H of an edge-coloured graph is called *rainbow* if all of the edges of H have different colours. In 1989, Andersen conjectured that every proper edge-colouring of K_n admits a rainbow path of length $n - 2$. We show that almost all optimal edge-colourings of K_n admit both (i) a rainbow Hamilton path and (ii) a rainbow cycle using all of the colours. This result demonstrates that Andersen's Conjecture holds for almost all optimal edge-colourings of K_n and answers a recent question of Ferber, Jain, and Sudakov. Our result also has applications to the existence of transversals in random symmetric Latin squares.

This is joint work with Tom Kelly, Daniela Kühn, and Deryk Osthus.