

# Properly coloured spanning trees in an edge coloured random graph

Carlos Hoppen

*Universidade Federal do Rio Grande do Sul*

Given a number of colours  $k \geq 1$ , we consider the probability space  $\mathcal{G}_{n,p}^k$  of edge-coloured random graphs, whose elements are produced by first generating a graph  $G$  in the Erdős-Rényi probability space  $\mathcal{G}_{n,p}$  and then colouring each edge of  $G$  independently and uniformly with a colour from the set  $[k] = \{1, \dots, k\}$ . We determine the threshold function  $p = p_k(n)$  for the property that such an edge-coloured random graph contains a properly coloured spanning tree, for all fixed  $k \geq 3$ . It turns out to coincide with the connectivity threshold, which is  $\log(n)/n$ . This contrasts with the case  $k = 2$ , where the threshold is known to be  $2 \log(n)/n$  in light of recent work by Espig, Frieze and Krivelevich. Among other ingredients, we obtained a new result about maximum matchings in  $\mathcal{G}_{n,p}$ .

This is joint work with P. Gao (Monash University, Australia) and J. Sanches (Instituto Federal do Paraná, Brazil)