REPRESENTING GROUPS BY ENDOMORPHISMS OF THE RANDOM GRAPH

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I will begin by introducing the so-called *random graph R*, a prime example of a countable ultrahomogeneous first-order structure. This will lead us to the outline of a beautiful subject in model theory, the *Fraïssé theory*, centred around the notion of an amalgamation class of structures.

The other basic ingredient of the talk will be semigroups, especially in the light of their links to groups via maximal subgroups of a semigroup and 'hidden' group structures called Schützenberger groups (of a $\mathscr{D}$-class). Hence, I will provide a gentle crash-course (excuse the pun) into the basics of semigroup theory. These fundamentals will be then applied to endomorphism monoids of structures, naturally leading to the concept of an algebraically closed structure.

Our main results establish links between countable algebraically closed graphs and the endomorphisms of the random graph R. In particular, we show that, for any countable graph Γ there are uncountable many maximal subgroups of the endomorphism monoid of R isomorphic to the automorphism group of Γ. Further structural information about $\mathrm{End}(R)$ is established including that $\mathrm{Aut}(\Gamma)$ arises in uncountably many ways as a Schützenberger group. Similar results hold for the countable universal directed graph and the countable universal bipartite graph.

The presented original results are obtained jointly with R.D.Gray (UEA, Norwich), J.D.McPhee, J.D.Mitchell and M.Quick (St Andrews).

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