Orbit coherence in permutation groups
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Let $G$ be a permutation group acting on a set $\Omega$. For $g \in G$, let $\pi(g)$
denote the partition of $\Omega$ given by the orbits of $g$. The set of all partitions of
$\Omega$ is naturally ordered by refinement and admits lattice operations of meet
and join. My talk concerns the groups $G$ such that the partitions $\pi(g)$ for
g $\in G$ form a sublattice. This condition is highly restrictive, but there are
still many interesting examples. These include centralisers in the symmetric
group $\text{Sym}(\Omega)$ and a class of profinite abelian groups which act on each
of their orbits as a subgroup of the Prüfer group. I shall also describe a
classification of the primitive permutation groups of finite degree whose set
of orbit partitions is closed under taking joins, but not necessarily meets, and
outline a proof that the automorphism group of the infinite rooted binary
tree has this property of join-coherence. This talk is on joint work with
John R. Britnell (Imperial College).