Almost exceptional simple permutations

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A simple permutation is a permutation that never maps a nontrivial contiguous set of indices contiguously. In 1993, Schmerl and Trotter proved (in the general context of binary relational structures) that every simple permutation on n points contains a simple permutation on $n-1$ or $n-2$ points. Furthermore, they characterised the *exceptional* simple permutations, which contain no simple on $n-1$ points: they are precisely the *parallel alternations*: permutations of the form $246\cdots n135\cdots n-1$ and its symmetries.

Motivated by a problem in graph theory, in this talk I will show how the methods used in Schmerl and Trotter's paper can be adapted to characterise the *almost exceptional* simple permutations, where there is a unique point that can be removed that keeps the permutation simple. They are, roughly, variants on parallel and wedge alternations.

This is joint work with Nic Georgiou.