ANDREW KING, McGill University, Montreal; Institute for Theoretical Computer Science, Prague
Fractional and integer colourings in claw-free graphs

Chudnovsky and Seymour recently characterized the structure of claw-free graphs, generalizing previous work by Maffray and Reed on Berge claw-free graphs. When the stability number is at least four, a claw-free graph is a particular generalization of a line graph.

In this work, we combine this structure with known results on fractional and integer colourings of line graphs. We previously used this approach to extend a conjecture of Reed ($\chi \le \lceil \frac{1}{2}(\Delta + 1 + \omega) \rceil$ for all graphs) from line graphs to claw-free graphs. More recently, we have proved that the fractional and integer chromatic numbers agree asymptotically for claw-free graphs with stability number at least four. This extends a probabilistic result of Kahn on line graphs, using the structural decomposition provided by Chudnovsky and Seymour.

Our proofs lead to polynomial-time algorithms for finding near-optimal colourings of claw-free graphs.

This is joint work with Bruce Reed.