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*Colouring Complexes*

Given a 3-colourable graph  $H$ , the colouring complex  $B(H)$  is the graph which has all the independent sets which are colour classes of  $H$  as its vertices and two vertices  $u, v \in V(B(H))$  joined by an edge if the colour classes  $u$  and  $v$  appear together in a 3-colouring of  $H$ . The graph  $B(H)$  is 3-colourable. Graphs for which  $B(B(H))$  is isomorphic to  $H$  are termed reflexive graphs. We show that the line graph  $H = L(G)$  of an outerplanar graph  $G$  which is cubic (after including half-edges at vertices whose degree was originally less than 3) is reflexive if and only if  $G$  is triangle-free. We then discuss other classes of reflexive graphs. This is joint work with Fiachra Knox and Bojan Mohar.