

# Facial parity edge colouring of bridgeless plane graphs

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A *facial parity edge colouring* of a connected bridgeless plane graph is such an edge colouring in which no two face-adjacent edges receive the same colour and, in addition, for each face  $f$  and each colour  $c$ , no edge or an odd number of edges incident with  $f$  are coloured with  $c$ . Let  $\chi'_p(G)$  denote the minimum number of colours used in a such colouring of  $G$ . In this paper we prove that  $\chi'_p(G) \leq 20$  for any 2-edge-connected plane graph  $G$ . In the case when  $G$  is a 3-edge-connected plane graph the upper bound for this parameter is 12. For  $G$  being 4-edge-connected plane graph we have  $\chi'_p(G) \leq 9$ . On the other hand we prove that some bridgeless plane graphs require at least 10 colours for such a colouring.