Normal edge coloring

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A normal edge coloring of a cubic graph is a proper edge coloring, in which every edge is adjacent to edges colored with four distinct colors or to edges colored with two distinct colors. It is conjectured that 5 colors suffices for a normal edge coloring of any bridgeless cubic graph and this statement is equivalent to the Petersen Coloring Conjecture. Currently, we only know that any cubic graph admits a normal edge coloring with at most 7 colors.

We present new results regarding the normal coloring of special graph classes. In the second part, we introduce the study of the list version of the normal edge coloring. It turns out to be more restrictive and consequently more colors are needed. In particular, we show that there are cubic graphs which need at least 9 colors for a list normal edge coloring and there are bridgeless cubic graphs which need at least 8 colors.