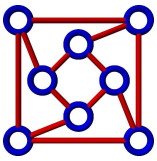

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UNIQUE-MAXIMUM COLORINGS OF PLANE GRAPHS

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A proper vertex coloring of a plane graph is unique-maximum (UM) if, for every face, the maximum color on its vertices is used exactly once. Wendland (2016) proved that every plane graph is UM 5-vertex-colorable and Lidický, Messerschmidt, and Škrekovski (2018) constructed a plane graph with corresponding chromatic number 5.

In this talk, we consider following two modifications of the previous coloring:

1) a proper vertex-face coloring of a plane graph is unique-maximum (UM) if, for every face, the maximum color on its vertices and on the face itself is used exactly once,

2) a proper vertex coloring of a plane graph is unique-double-maximum (U2M) if, for every face, the highest color and the second highest color on its vertices are used exactly once,

compare these two colorings, and present upper bounds on the corresponding chromatic numbers for the set of plane graphs.