ON THE EDGE-RAINBOWNESS OF A FAMILY OF PLANE GRAPHS

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A face of an edge colored plane graph is called *rainbow* if all its edges receive distinct colors. The maximum number of colors used in edge coloring of a connected plane graph G with no rainbow face is called *the edge - rainbowness* of G. The graph H is said to be a *face factor* of a plane graph G, if $V(H) = V(G)$, $E(H) \subseteq E(G)$ and for every face $f \in F(G)$ there is a face $f' \in F(H)$, such that f is involved in f'. A face factor H of a connected plane graph G is called a *bridge face factor* if every face of H is incident with a bridge. It is proved [1] that the edge rainbowness of G equals to the number of edges of a maximum connected bridge face factor H of G.
Shin-Shin Kao and Lih-Hsing Hsu defined spider web network $SW(m,n)$ as follows:
For even integers $m \geq 4$, $n \geq 2$, $SW(m,n)$ is a graph with the vertex set $\{(i,j); 0 \leq i < m, 0 \leq j < n\}$ such that (i,j) and (k,l) are adjacent if they satisfy one of the following conditions:

1. $i = k$ and $j = l + 1$ or $i = k$ and $j = l - 1$; or
2. $j = l$ and $k = [i+1]_m$ if $i + j$ is odd or $j = n - 1$; or
3. $j = l$ and $k = [i-1]_m$ if $i + j$ is even or $j = 0$.

In the talk we show upper and lower bounds on the edge rainbowness of spider graphs $SW(m,n)$ for every possible m and n.

References

[1] S. Jendroľ, J. Miškuf, R. Soták, E. Škrabuľáková, *Rainbow Faces in Edge Colored Plane Graphs*, submitted.