1017-57-32 **Milena Dorota Pabiniak*** (pabiniak@gwu.edu), 1922 F Street NW, Washington, DC 20052, and **Jozef H Przytycki** (przytyck@gwu.edu) and **Radmila Sazdanovic** (radmila@gwu.edu).
Chromatic graph A_3 homology from geometric properties of graphs.

We are analyzing properties of the first group of A_3 graph homology. We concentrate on the grading implied by the interpretation of Hochschild homology as graph homology of a polygon. In particular, we prove that if G is a simple graph and v_1, v_2 are vertices of G such that the distance $d(v_1, v_2) \geq 5$ and $G' = G/(v_1 = v_2)$ is a graph obtained from G by identifying vertices v_1 and v_2 then

$$H_{A_3}^{1,2v(G')-3}(G') = H_{A_3}^{1,2v(G)-3}(G).$$

From this follows that:

(i) for one vertex product of two simple graphs G_1 and G_2 $H_{A_3}^{1,2v(G_1 * G_2)-3}(G_1 * G_2) = H_{A_3}^{1,2v(G_1)-3}(G_1) \oplus H_{A_3}^{1,2v(G_2)-3}(G_2)$.

(ii) If an edge e does not belong to any cycle of length 3 or 4 then: $H_{A_3}^{1,2v-3}(G - e) = H^{1,2v-3}(G)$.

Further, we conjecture that:

(i) if a simple graph G has a cycle of length 3 then $H_{A_3}^{1,2v(G)-3}(G)$ contains $\mathbb{Z}_3$;

(ii) if $G|P_3$ is a graph obtained from a disjoint sum of G and P_3 by identifying one edge of the graph with one edge of P_3, then $Tor(H_{A_3}^{1,2v(G|P_3)-3}(G|P_3)) = Tor(H_{A_3}^{1,2v(G)-3}(G)) \oplus \mathbb{Z}_3$;

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