Cycles of Length 0 Modulo $l$ in Graphs

Seyed Amin Seyed Fakhari
Sharif University of Technology
Iran

Let $l$ be a natural number. A graph $G$ is called a \((0 \ mod \ l)\)-cycle, if the length of each cycle of $G$ is divisible by $l$. Let $G$ be a graph of order $n$ and size $m$. In this talk it is shown that if $G$ is a \((0 \ mod \ l)\)-cycle graph ($l \geq 3$), then \( \frac{m}{n} < 2 \). We show that if $G$ is a non-planar graph, then $G$ has a cycle of length divisible by 4. G. Chen and A. Saito proved that if $G$ has no cycle of length divisible by 3, then $m \leq 2n - 4$, ($n \geq 3$). It is proved that if $G$ has no cycle of length divisible by 4 then $m \leq 2n - 3$. We conjecture that if $G$ is a graph with no cycle of length divisible by 4, then $m \leq \frac{3}{2}(n - 1)$. Finally, we prove that the conjecture is true for bipartite graphs.