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Corrigendum to "Laplacian Spectral Radius and Some Hamiltonian Properties of Graphs" [Applied Mathematics E-Notes 14(2014) 216-220]*

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Abstract

A revised version of Theorem 3 and its proof in [1] are presented.

As pointed out by Q. Zhou, there was a mistake in the proof of Theorem 3 in [1]. We present a revised version of Theorem 3 and its proof in [1] below.

THEOREM 3. Let G be a connected graph with order $n \geq 3$, size e and minimum degree δ. If $(2\delta+1)^2 + 4(f_3(n) - 2\delta(e+1)) \geq 0$ and

$$\mu > \frac{(2\delta+1) + \sqrt{(2\delta+1)^2 + 4(f_3(n) - 2\delta(e+1))}}{2},$$

then G is Hamilton-connected, where $f_3(n) = ((n-2)n^2 + 8(n-3)(n-2)^2 + 4n(n-1)^2)/8$.

PROOF of THEOREM 3. Let G be a graph satisfying the conditions in Theorem 3. Suppose that G is not Hamilton-connected. Then, from Lemma 3 in [1], there exists an integer k such that $2 \leq k \leq \frac{n}{2}$, $d_{k-1} \leq k$, and $d_{n-k} \leq n-k$. Obviously, $d_{k-1} \geq 1$. Then, from Lemma 4 in [1], we have that

$$\mu \leq d_1 + \frac{1}{2} + \sqrt{\left(d_1 - \frac{1}{2}\right)^2 + \sum_{i=1}^{n} d_i(d_i - d_1)},$$

Thus

$$\mu^2 - \mu(2\delta+1) + 2\delta(1+e) \leq \sum_{i=1}^{n} d_i^2.$$

Notice that

$$\begin{aligned}
\sum_{i=1}^{n} d_i^2 &\leq (k-1)k^2 + (n-2k+1)(n-k)^2 + k(n-1)^2 \\
&\leq \left(\frac{n-2}{2}\right)\left(\frac{n}{2}\right)^2 + (n-3)(n-2)^2 + \frac{n(n-1)^2}{2} \\
&= \frac{(n-2)n^2 + 8(n-3)(n-2)^2 + 4n(n-1)^2}{8}.
\end{aligned}$$

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Set

$$f_3(n) := \frac{(n-2)n^2 + 8(n-3)(n-2)^2 + 4n(n-1)^2}{8}.$$

Hence

$$\mu^2 - \mu(2\delta+1) + 2\delta(1+e) - f_3(n) \leq 0.$$

Since $(2\delta+1)^2 + 4(f_3(n) - 2\delta(e+1)) \geq 0$, we can solve the inequality and get

$$\mu \leq \frac{(2\delta+1) + \sqrt{(2\delta+1)^2 + 4(f_3(n) - 2\delta(e+1))}}{2},$$

which is a contradiction. This completes the proof of Theorem 3.

References

[1] R. Li, Laplacian spectral radius and some Hamiltonian properties of graphs, Appl. Math. E-Notes , **14**(2014), 216–220.