A NOTE ON TOTAL GRAPHS

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Abstract

Erratum: Identification and corrections of the existing mistakes in the paper 

Keywords: total graph, central graph, middle graph, Mycielski graph.

2010 Mathematics Subject Classification: 05C76, 05C69.

1. Results

In this paper, we correct the Theorems 1, 4, 8 and 11, and their corollaries of [1]. There was omitted \( t(G) \), i.e., the number of triangles in \( G \) or \( L(G) \) in Theorem 1 of [1]. The total graph \( T(G) \) contains triangles in \( G \), \( L(G) \) and in the incidence graph. All triangles are numbered in the published paper [1] beside triangles in \( G \) or \( L(G) \). First, we give corrected version of Theorem 1 of [1] as follows by adding the number of omitted triangles \( t(G) \), and its proof is in similar lines as before.
Theorem 1. For any \((p, q)\) graph \(G\),

\[
t[T(G)] = 2t(G) + \frac{1}{2} \sum_{i=1}^{p} \left[ d_G^2(v_i) + 2m_i \left( \frac{d_G(v_i)}{3} \right) \right],
\]

where \(m_i = 1\) if \(d_G(v_i) \geq 3\); otherwise \(m_i = 0\).

Due to the change in the statement of Theorem 1 of [1], the remaining Theorems 4, 8, 11 and their corollaries of [1] are corrected as follows.

Corollary 2. (a) \(t[T(C_3)] = 8\) and \(t[T(C_n)] = 2n\) if \(n > 3\).
(b) For \(n \geq 1\), \(t[T(K_n)] = \frac{1}{6} \left[ (n^2 - n)(n^2 - 1) \right]\).

Corollary 3. For \(1 \leq i \leq n\) and \(n \geq 2\), \(t[T(\square_{i=1}^n C_m)] = \frac{2Mn}{3}(2n^2 + 1)\) where \(M = m_1m_2 \cdots m_n, m_i > 3\).

Theorem 4. Let \(G\) be any \((p, q)\)-graph having \(t(G)\) triangles and \(\delta(G) \geq 2\). Then

\[
t[T(\mu(G))] = 8t(G) + \frac{1}{2} \sum_{i=1}^{p} \left[ 3d_G^3(v_i) + d_G^2(v_i) \right] + \left( \frac{18q + 5p + p^3}{6} \right).
\]

Corollary 5. For \(n > 3\), \(t[T(\mu(C_n))] = \left( \frac{n^3 + 107n}{6} \right)\).

Corollary 6. For \(n \geq 3\), \(t[T(\mu(K_n))] = \frac{1}{6}(9n^4 - 15n^3 + 6n^2 + 6n)\).

Theorem 7. For any \((p, q)\)-graph \(G\),

\[
t[M(G)] = t(G) + \frac{1}{2} \sum_{i=1}^{p} \left[ d_G^2(v_i) + 2m_i \left( \frac{d_G(v_i)}{3} \right) \right] - q,
\]

where \(m_i = 1\) if \(d_G(v_i) \geq 3\); otherwise \(m_i = 0\).

Corollary 8. For any \((p, q)\)-graph \(G\),

\[
t[M(\mu(G))] = 4t(G) + \frac{1}{2} \sum_{i=1}^{p} \left[ 3d_G^3(v_i) + d_G^2(v_i) \right] + \frac{p(p^2 - 1)}{6}.
\]

Theorem 9. For any \((p, q)\)-graph \(G\) with \(p \geq 4\),

\[
t[T(C(G))] = 2m + \frac{1}{6} (p^4 - 3p^3 + 5p^2 - 3p + 12q),
\]

where \(m = t(C(G))\).

Corollary 10. For \(m, n \geq 3\),

\[
t[T(C(K_{m,n}))] = t[T(K_{m+n})] - mn(m + n - 4).
\]
Acknowledgement

The authors gratefully acknowledge the referee for his valuable suggestions.

References


Received 3 May 2014
Revised 4 July 2014
Accepted 3 September 2014