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Note

A NOTE ON TOTAL GRAPHS

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Abstract

Erratum: Identification and corrections of the existing mistakes in the paper *On the total graph of Mycielski graphs, central graphs and their covering numbers*, Discuss. Math. Graph Theory **33** (2013) 361–371.

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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,

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

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* $n \geq 2$, $t[T(\Box_{i=1}^{n} C_{m_i})] = \frac{2Mn}{3}(2n^2+1)$ *where* $M = m_1 m_2 \cdots m_n$, $m_i > 3$.

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,

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

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

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

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

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* $m, n \geq 3$,

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

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References

[1] H.P. Patil and R. Pandiya Raj, *On the total graph of Mycielski graphs, central graphs and their covering numbers*, Discuss. Math. Graph Theory **33** (2013) 361–71. doi:10.7151/dmgt.1670

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