Addendum

The diameter of an orientation of a complete multipartite graph

[Discrete Math. 149 (1996) 131–139]¹

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Given a bridgeless connected graph $G$, let $\mathcal{D}(G)$ denote the family of strong orientations of $G$. Define

$$\varepsilon(G) = \min \{\text{diam } D | D \in \mathcal{D}(G)\},$$

where diam $D$ is the diameter of the digraph $D$. Let $K(p_1, p_2, \ldots, p_n)$ denote the complete $n$-partite graph having $p_i$ vertices in the $i$th partite set. Assume that $n \geq 3$.

Koh and Tan proved in [2] the following results:

1. $2 \leq \varepsilon(K(p_1, p_2, \ldots, p_n)) \leq 3$;
2. Let $h = p_1 + p_2 + \cdots + p_n$. If $p_i > \left(\frac{h - p_i}{\frac{p_i}{2}}\right)$ for some $i = 1, 2, \ldots, n$, then $\varepsilon(K(p_1, p_2, \ldots, p_n)) = 3$;
3. $\varepsilon(K(p_1, p_2, \ldots, p_n)) = 2$ if $p_1 = p_2 = \cdots = p_n \geq 2$; and
4. for $1 \leq q \leq 2p$, $r \geq 3$ and $p \geq 3$, $\varepsilon(K(p, p, \ldots, p, q)) = 2$.

While [2] was in press, we learned that results (1) and (3) had also been proved by Gutin [1]. Indeed, we have just been informed by Professor Plesnik that these two results had been obtained much earlier by him in [4]. We would like to express our sincere thanks to him for this information.

Finally, we would like to add that results (3) and (4) have been extended very recently. A pair of integers $p$ and $q$ is a co-pair if

$$1 \leq p \leq q \leq \left(\frac{p}{\left\lfloor \frac{p}{2} \right\rfloor}\right).$$

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A multiset \( \{p, q, r\} \) of positive integers is a **co-triple** if \( \{p, q\} \) and \( \{p, r\} \) are co-pairs. Koh and Tan established in [3] that if \( \{p_1, p_2, \ldots, p_n\} \) can be partitioned into co-pairs when \( n \) is even, and into co-pairs and a co-triple when \( n \) is odd, then \( e(K(p_1, p_2, \ldots, p_n)) = 2 \) provided that \( (n, p_1, p_2, p_3, p_4) \neq (4, 1, 1, 1, 1) \).

**References**


