Comments on “Availability of k-Coterie”

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Abstract—Kakugawa et al. proposed the k-majority coterie for the distributed k-mutual exclusion problem (k-mutex). It was claimed that the k-majority coterie is a k-coterie, which is a general solution for k-mutex. In this comment, we show that the k-majority coterie is not necessary a k-coterie.

Index Terms—Coterie, mutual exclusion, distributed system.

Kakugawa et al. proposed the k-majority coterie for the distributed k-mutual exclusion problem (k-mutex) [1]. The authors claimed that the k-majority coterie is a k-coterie. However, we find that this is not true for all n and k. For example, consider n = 8, k = 3, and thus W = 3. Let Q1, Q2 be two elements in Mnj3 such that Q1 ∩ Q2 = Φ. If there exists an element Q in C (|Q| = 3) such that Q ∩ Q1 = Φ and Q ∩ Q2 = Φ, then

$$|Q \cup Q_1 \cup Q_2| = |Q| + |Q_1| + |Q_2| = 9 > n.$$ 

It is a contradiction.

To satisfy the conditions in Definition 2, the following conditions must hold for the k-majority coterie:

B1) kW ≤ n;

B2) (k + 1)W > n;

where W is an integer.

In other words, there must exist an integer in \(\left\lfloor \frac{n}{k+1} \right\rfloor\), which means that \(\left\lfloor \frac{n}{k+1} \right\rfloor < \frac{n}{k+1}\).

REFERENCES