Coverings and packings of complete directed graphs by odd circuits

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Abstract

Let DK_v denote the complete directed graph with v vertices, covering (packing) number $C(v,m)$ $(P(v,m))$ of DK_v is a minimum (maximum) number of covering (packing) DK_v by m-circuits. In this paper, determination of C(v,m) is reduced to the case $m+7 \leq v \leq 2m-4$ and $2m+5 \leq v \leq 3m-4$ for any odd integer $m \geq 15$. Determination of $P(v,m)$ is reduced to the case $m+5 \leq v \leq 2m-\left\lfloor \frac{\sqrt{4m-3}+1}{2} \right\rfloor$ and $2m+5 \leq v \leq 3m-\left\lfloor \frac{\sqrt{4m-3}+1}{2} \right\rfloor$ for any odd integer $m \geq 15$, under the conditions of theorem 1.3. C(v,m) and $P(v,m)$ are determined when $v \geq m$ and $m = 15, 17$.

Keywords: *m-circuits; covering number; packing number; complete directed graph*