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30144. *Extending Matchings to Perfect Matchings in Cartesian Products of Even  
Cycles*. Preliminary report.

In a bipartite graph  $G$ , a set  $S \subseteq V(G)$  is *deficient* if  $|N(S)| < |S|$ . A matching  $M$  (with vertex set  $U$ ) is  *$k$ -suitable* if  $G - U$  has no deficient set of size less than  $k$ . Let  $C_{2m}^d$ , where  $m \geq 2$ , be the  $d$ -fold cartesian product of the cycle  $C_{2m}$ . We show for any  $k$  such that  $1 \leq k \leq d$ , every  $k$ -suitable matching in  $C_{2m}^d$  with at most  $f(k, d)$  edges extends to a perfect matching in  $C_{2m}^d$ , where  $f(k, d) = k(2d - k) + \binom{k-1}{2}$ . Moreover, for each  $1 \leq k \leq d$ , we show there exists a  $k$ -suitable matching with  $f(k, d) + 1$  edges that does not extend to a perfect matching in  $C_{2m}^d$ . We use a similar approach to that of the first author and West, who solved this problem in 2009 for hypercubes. (Received January 14, 2020)