Each regular 3-partite tournament has a 9-cycle

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Abstract - In this paper we build on, and strengthen, a recent conjecture of Volkmann [6] on the existence of directed cycles of length $3k$ in regular 3-partite tournaments. Additionally, we consider another conjecture of Volkmann [6], whether every arc belongs to a cycle of length k, $k + 1$ or $k + 2$ for some k. Our main result are the answers to the first problem for $k = 3$, and the second for $k = 6, 7$.
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