

**The diameter of the generalized Petersen graph
 $GP[n, m]$ for coprime integers n and m**

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The problem of calculating the distances among all pairs of vertices in a graph has been studied for a long time. The diameter of a graph is found by identifying the pair of vertices which are the furthest apart. In this work, we investigate the diameter of the family of generalized Petersen graphs $GP[n, m]$ where n and m are coprime positive integers. The graph $GP[n, m]$ is the graph on the $2n$ vertices $\{u_0, u_1, \dots, u_{n-1}, v_0, v_1, \dots, v_{n-1}\}$ having $3n$ edges $\{u_i u_{i+1}, v_i v_{i+m}, u_i v_i \mid i = 0, \dots, n-1; \text{addition mod } n\}$. Zhang *et al.* [1] showed that the diameter of the generalized Petersen graphs is of the order $O(\frac{n}{2m})$. We show that, for coprime positive integers n and m , the diameter of $GP[n, m]$ depends on the parity of $\lfloor \frac{n}{m} \rfloor$ and on the value of $n \bmod m$, and establish exact values for the diameter of this family of graphs.

References:

- [1] J. Zhang, X.-R. Xu, & J. Wang. Wide Diameter of Generalized Petersen Graphs. *Journal of Mathematical Research & Exposition*, 30(3): 562–566, 2010.