



THE ART OF DISCRETE AND  
APPLIED MATHEMATICS

ISSN 2590-9770

The Art of Discrete and Applied Mathematics 2 (2019) #P1.04

<https://doi.org/10.26493/2590-9770.1246.99c>

(Also available at <http://adam-journal.eu>)

# Optimal orientations of strong products of paths

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Received 9 March 2018, accepted 13 July 2018, published online 8 August 2018

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## Abstract

Let  $\text{diam}_{\min}(G)$  denote the minimum diameter of a strong orientation of  $G$  and let  $G \boxtimes H$  denote the strong product of graphs  $G$  and  $H$ . In this paper we prove that  $\text{diam}_{\min}(P_m \boxtimes P_n) = \text{diam}(P_m \boxtimes P_n)$  for  $m, n \geq 5$ ,  $m \neq n$ , and  $\text{diam}_{\min}(P_m \boxtimes P_n) = \text{diam}(P_m \boxtimes P_n) + 1$  for  $m, n \geq 5$ ,  $m = n$ . We also prove that  $\text{diam}_{\min}(G \boxtimes H) \leq \max \{\text{diam}_{\min}(G), \text{diam}_{\min}(H)\}$  for any connected bridgeless graphs  $G$  and  $H$ .

*Keywords:* Diameter, strong orientation, strong product.

*Math. Subj. Class.:* 05C12, 05C76

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<https://doi.org/10.26493/2590-9770.1246.99c>(Dostopno tudi na <http://adam-journal.eu>)

# Optimalne orientacije krepkih produktov poti

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Prejeto 9. marca 2018, sprejeto 13. julija 2018, objavljeno na spletu 8. avgusta 2018

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## Povzetek

Naj  $\text{diam}_{\min}(G)$  označuje minimalni premer krepke orientacije grafa  $G$  in naj  $G \boxtimes H$  označuje krepki produkt grafov  $G$  in  $H$ . V tem članku dokažemo, da velja  $\text{diam}_{\min}(P_m \boxtimes P_n) = \text{diam}(P_m \boxtimes P_n)$  za  $m, n \geq 5$ ,  $m \neq n$ , in  $\text{diam}_{\min}(P_m \boxtimes P_n) = \text{diam}(P_m \boxtimes P_n) + 1$  za  $m, n \geq 5$ ,  $m = n$ . Dokažemo tudi, da velja  $\text{diam}_{\min}(G \boxtimes H) \leq \max \{\text{diam}_{\min}(G), \text{diam}_{\min}(H)\}$  za vsak par povezanih grafov  $G$  in  $H$ , ki ne vsebujeja mostu.

*Ključne besede:* Premer, krepka orientacija, krepki produkt.

*Math. Subj. Class.:* 05C12, 05C76

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