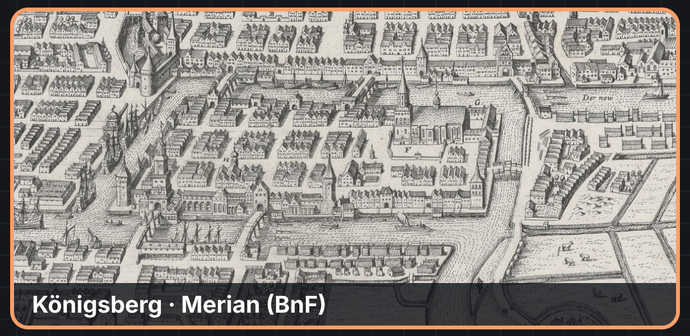
Pi & Planck

PROBLEM WITH SOLUTION

Can You Cross All Seven Bridges Once?

Euler's answer is often cited as the start of graph theory.

THE PUZZLE

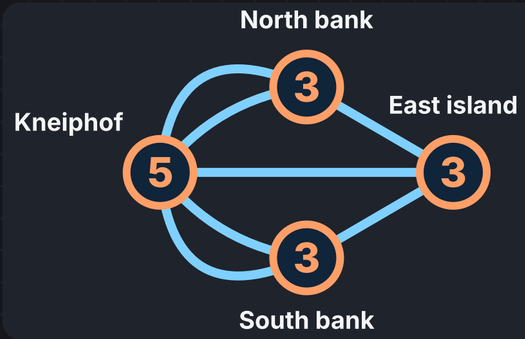


Königsberg · Merian (BnF)



Grüne Brücke, one of the seven

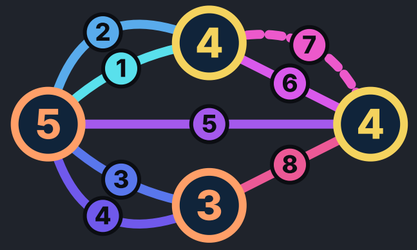
EULER'S ARGUMENT



Pass through a land mass: one bridge in, one out.

So only the start and the end can have an odd number of bridges.

Königsberg: 5, 3, 3, 3. All four are odd.



Add one bridge (dashed): only two land masses stay odd.

A route now exists: start at Kneiphof, end at the south bank.

LEONHARD EULER



Leonhard Euler, 1707–1783

Pastel: J. E. Handmann, 1753

1735	Euler presents his solution to the St Petersburg Academy (26 August)
1741	Published in Commentarii, vol. 8 (dated 1736), pp. 128–140
1750	Letter to Goldbach: V − E + F = 2 for polyhedra (14 November)
1758	The polyhedron papers E230 and E231 appear in print
1783	Euler dies in St Petersburg (18 September)

7 bridges join four land masses: Kneiphof island (5), north bank (3), south bank (3), east island (3).

0 routes among all 645,120 ordered crossings of the seven bridges, checked by computer.

866 works in Eneström's index of Euler's writings, as counted by the Euler Archive.

Sources: L. Euler, E53, *Comment. Acad. Sci. Petrop.* 8 (1736), 128–140 · Euler Archive (E53, E230, E231, Eneström index) · MacTutor · Stony Brook MAT 150 · Princeton Math Alive · Images (public domain): M. Merian (BnF); Bildarchiv Ostpreußen; J. E. Handmann (Kunstmuseum Basel)

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