PROOF FOR CLOSED EULERIAN TRAILS

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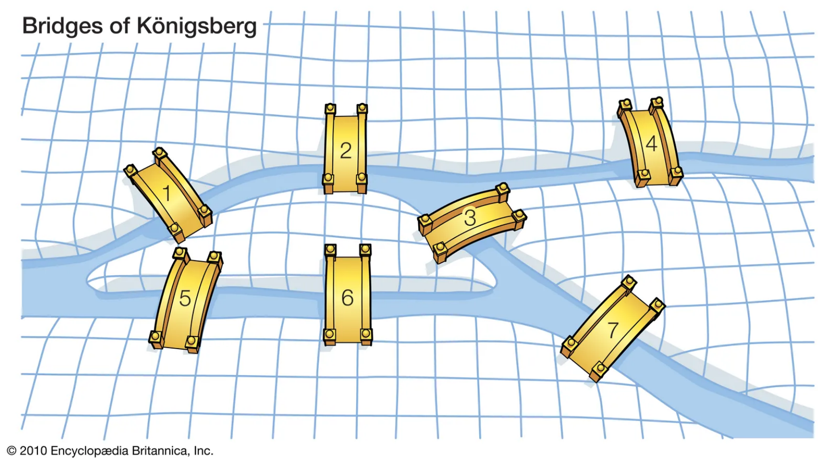
Abstract. In this paper we explore a proof showing that a graph contains a closed Eulerian trail if and only if all of its vertices have even degree. We show part of this proof by developing an algorithm.

1. Introduction

This problem dates back to 18th century Königsberg, Prussia, modern day Kaliningrad, Russia. Königsberg had seven bridges that connected four landmasses, the figure below shows roughly how the bridges were arranged. The citizens of Königsberg wonder if a person could walk across town and cross each bridge exactly once.



2. Theorem Environments

Theorem 1 (Ramsey, 1930). *This is how you create a theorem. The reference next to the Theorem name can be left out.*

Proof. This is how you can create a proof environment. □

In the tex file, note that a label was added within the above theorem environment. This is so that you can refer to Theorem 1 and if you add more theorems to the paper, they will automatically be renumbered. The same is true for references. You may refer to [5]. It may be necessary to compile the tex file twice before the labels show up. All sources used in your paper should be listed as in the samples below. The first, second, and fifth references are articles, while the third and fourth are books.

Here is a sample of a math environment: $\sqrt[4]{14}$. Use double \$ if you wish to have a math environment centered on a line by itself:

$$\int\limits_1^\infty e^{-x}\ dx.$$

If you would like to have an equation be numbered, use the following:

$$4x^5 + 3y^7 = 85. \tag{1}$$

You can then refer label in the equation. Eg., equation (1) pulls up the correct number.

Equations, inequalities, etc... can be aligned using the following commands:

$$\begin{aligned} \delta(H) &= n - (r-1) - \Delta(\overline{H}) \\ &\geq n - (r-1) - (m+2) \\ &\geq n - m - r - 1 \tag{2} \end{aligned}$$

As with the equation environment, each line that has \notag will not be labelled, and putting a label allows you to refer to property (2).

Matrices can be created using the array command:

$$\left(\begin{array}{rrr} -2 & 3 & -7 \\ 2 & 0 & 4 \end{array} \right)$$

References

1. V. Chvátal, *Tree-complete Graph Ramsey Numbers,* J. Graph Theory **1** (1977), 93.
2. V. Chvátal and F. Harary, *Generalized Ramsey Theory for Graphs III. Small Off-diagonal Numbers,* Pacific J. Math. **41** (1972), 335-345.
3. K. Ireland and M. Rosen, "A Classical Introduction to Modern Number Theory," 2^{nd} edition, Springer-Verlag, 1990.
4. G. Janusz, "Algebraic Number Fields," 2^{nd} edition, Graduate Studies in Mathematics **7**, American Mathematical Society, Providence, RI, 1996.
5. F. Ramsey, *On a Problem of Formal Logic,* Proc. London Math. Soc. **30** (1930), 264-286.