



Technische Universität Berlin  
Faculty VII (Economics and Management)  
Workgroup for Infrastructure Policy (WIP)

# **Operations Research – Methods for Network Engineering**

Tutorial Catalog - Solutions

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## Contents

<b>1</b>	<b>Flow Problems</b>	<b>1</b>
1.1	Professor Adams . . . . .	1
1.2	Residual Flows . . . . .	1
<b>2</b>	<b>Game Theory</b>	<b>3</b>
2.1	Nash-Equilibrium . . . . .	3
2.2	Non-Cooperative Market Games in an Oligopoly . . . . .	3
2.3	The Doner Kebab Syndicate . . . . .	7
<b>3</b>	<b>Complementarity Problems</b>	<b>10</b>
3.1	Positive (Semi-)Definite . . . . .	10
3.2	Convexity . . . . .	10
3.3	Karush-Kuhn-Tucker Conditions . . . . .	10

# 1 Flow Problems

## 1.1 Professor Adams

Create a vertex for each corner, and if there is a street between corners  $i$  and  $j$ , create direct edges  $(i, j)$  and  $(j, i)$ . Set the capacity of each edge to one. Let the source be the corner on which the professors house sits, and the sink be the corner on which the school is located. We wish to find a flow of value two that also has the property that  $f(i, j)$  is an integer for all vertices  $i$  and  $j$ . Such a flow represents two edge-disjoint paths from the house to the school.

## 1.2 Residual Flows

(1) Finding the residual flow network consists of two steps.

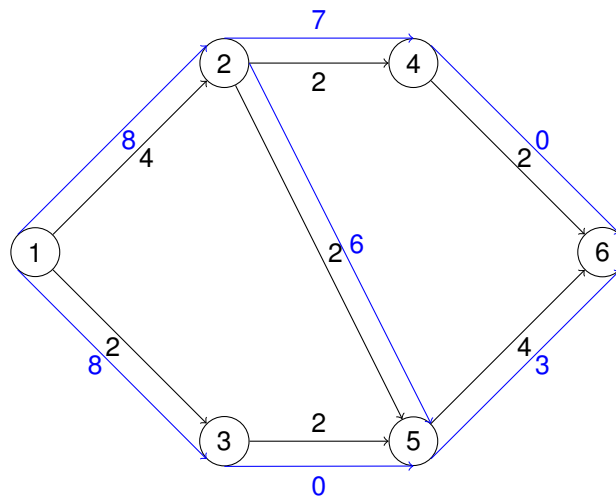


Figure 1: Part I

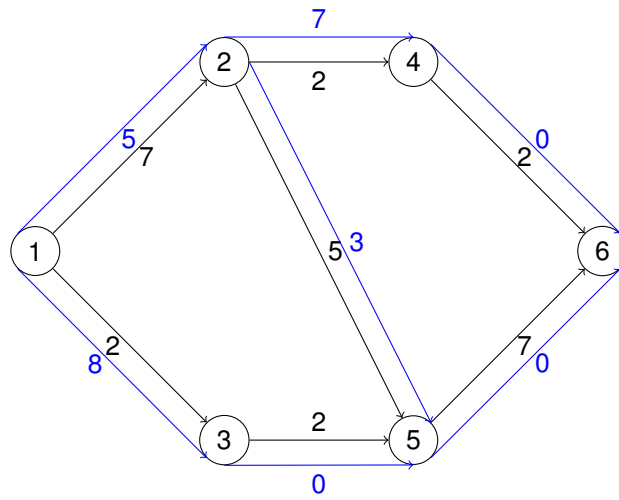


Figure 2: Part II

(2) Residual network for 5.2 b)

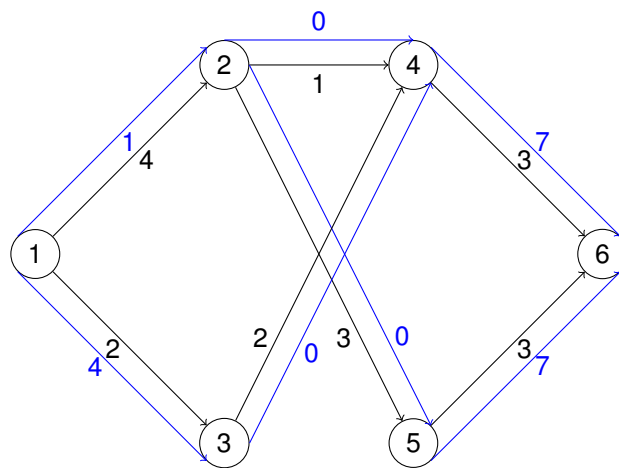


Figure 3: Solution