

# An Economic Interpretation of Duality

Зачетное задание для студентов РАФ и РГФ

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Методы оптимальных решений

Самостоятельная работа

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# Зачетное задание—Quiz Assignment

## 1 Problem Statement

- Direct Problem
- Dual Problem
- Assignment for your individual quiz work

## 2 Вопросы & Ответы

- Q & A

# The Direct Problem Statement

The Almine Coal Company has four mines. Each mine produces three types of coal, as shown in the following table.

①

Mine	Daily cost production (in hundreds of tones)			Cost of operation (in thousands of dollars)
	Type			
	A	B	C	
I	4	5	3	4
II	2	1	0	2
III	3	2	5	3
IV	4	2	6	3
Orders	20	30	40	

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Its problem is to fill its orders at minimum cost.

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# The Dual Problem Statement

## Another company shows its interest and makes an offer

The managers of a private company, Kraye & Sons, have access to this information and feel they can mine coal more cheaply.

- 1 However, they do not have the distribution capability of Almine.
- 2 They offer to operate Almine's facilities and then sell the coal, already sorted by type, to Almine.
- 3 Kraye & Sons' problem is to find an offer, attractive to Almine, which produces the greatest profit for them.

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# Solve separately the both problems

## For each problem, first define

- 1 What are the unknowns?
- 2 What are the cost/profit formula?
- 3 What is the objective?
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## Then do the following assignments:

- 1 Solve the both, direct and dual, problems manually using Simplex Method.

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- 1 What are the unknowns?
- 2 What are the cost/profit formula?
- 3 What is the objective?
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## Then do the following assignments:

- 1 *(to view, go backwards)*
- 2 Solve the both, direct and dual, problems automatically using the SimplexWin program.

# Solve separately the both problems

## For each problem, first define

- 1 What are the unknowns?
- 2 What are the cost/profit formula?
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- 4 What are the constraints?

## Then do the following assignments:

- 1 *(to view, go backwards)*
- 2 *(to view, go backwards)*
- 3 Give your written explanations to your solutions.



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