

EasyBadge code: 175270

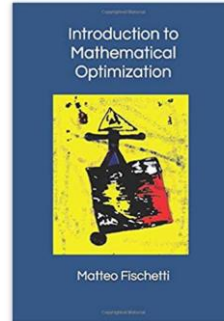
Operations Research 1 (Prof. Fischetti) 2021-2022

Lessons:

Monday @16:30 L_e
 Tuesday @16:30 V_e
 Wednesday @14:30 L_e

Book:

Fischetti "Introduction to Mathematical Optimization"
 (in English, from Amazon -- also ebook)
<https://www.amazon.it/dp/1692792024/>



Exams 2021-2022 (tentative schedule to be confirmed) ***written only***

20-january-2022 @ 16:00 V_e + K_e
 24-february-2022 @ 10:00 V_e + K_e
 16-june-2022 @ 10:00 V_e + K_e
 31-august-2022 @ 10:00 V_e + B_e (Be instead of Ke)

Monday, October 4, 2021

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What is Operations (aka Operational) Research?

The examples and perspective in this article may not represent a worldwide view of the subject. The specific issue is: **US perspective completely neglected, George Dantzig gets a passing mention only** You may improve this article, discuss the issue on the talk page, or create a new article, as appropriate. (December 2020) [Learn how and when to remove this template message](#)

Operations research (British English: **operational research**), often shortened to the initialism **OR**, is a discipline that deals with the development and application of advanced analytical methods to improve decision-making.^[1] It is sometimes considered to be a subfield of mathematical sciences.^[2] The term *management science* is sometimes used as a synonym.^[3]

Employing techniques from other mathematical sciences, such as modeling, statistics, and optimization, operations research arrives at optimal or near-optimal solutions to complex decision-making problems. Because of its emphasis on practical applications, operations research has overlap with many other disciplines, notably industrial engineering. Operations research is often concerned with determining the extreme values of some real-world objective: the maximum (of profit, performance, or yield) or minimum (of loss, risk, or cost). Originating in military efforts before World War II, its techniques have grown to concern problems in a variety of industries.^[4]

https://en.wikipedia.org/wiki/Operations_research

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2.3 Hospital shifts

The aim is to organize the nurses' shifts in a hospital. Each nurse works 5 consecutive days - regardless of the starting day within the week - and is entitled to two days off. Service requirements for the various days of the week require the presence of the following minimum number of nurses:

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Number	17	13	15	19	14	16	11

We want to organize the service in such a way so as to minimize the total number of nurses.

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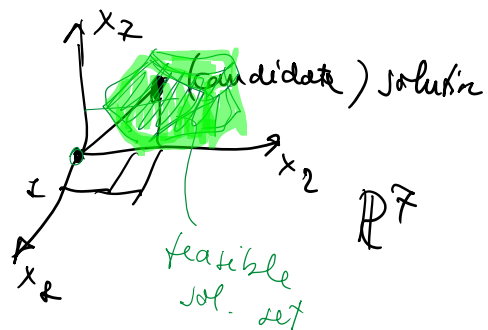
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Decision var. s

$x_1 =$ n. of nurses starting on Monday [1]
 $x_2 =$ " " " " Tuesday [2]
 \vdots
 $x_7 =$ " " " " Sunday [7]

NURSES
HOSPITAL



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$$\begin{array}{l}
 \min \quad x_1 + x_2 + \dots + x_7 \quad \rightarrow \text{OBJECTIVE FUNCTION} \\
 \text{total n. of nurses} \\
 \text{subject to} \\
 x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 \geq 17 \quad [\#1] \\
 \text{n. of nurses present on day \#1} \\
 x_1 + x_2 \quad \quad \quad + x_5 + x_6 + x_7 \geq 13 \quad [\#2] \\
 \vdots \\
 \dots \quad \quad \quad \geq 11 \quad [\#7] \\
 x_1, x_2, \dots, x_7 \geq 0
 \end{array}$$

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FRANZ EDELMAN AWARD



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Franz Edelman Award for Achievement in
Advanced Analytics, Operations Research,
and Management Science

<https://www.informs.org/Recognizing-Excellence/INFORMS-Prizes/Franz-Edelman-Award>

2019 Edelman Finalist Vattenfall <https://youtu.be/97QU0T12oUo>

2021 Edelman Winner: UN World Food Programme <https://youtu.be/wdEcVj5LTGg>

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