# Semidefinite Programming

Applications in approximating NP-Complete problems & Matrix Completetion

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### **Presentation Overview**

- Semidefinite Programming
- 2 Travelling Salesman
- 3 Matrix Completetion

Overview

Relaxation

Fashion-MNIST

Blocks

Columns

4 Table and Figure Examples

**Table** 

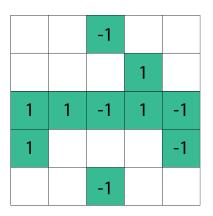
**Figure** 

- 6 Mathematics
- **6** Referencing



### Low rank matrices

Given an incomplete, can we recover the missing values?



1	1	-1	1	-1
1	1	-1	1	-1
1	1	-1	1	-1
1	1	-1	1	-1
1	1	-1	1	-1

### Low rank matrices

#### Yes! Given:

- The matrix is low rank
- We have enough sample data

# Why is this useful

- 1 Netflix has an incomplete set of user preferences based off their past watch history. They
- 2 Recommendation Engine
- 3 Images

#### Lists

#### **Bullet Points and Numbered Lists**

- Lorem ipsum dolor sit amet, consectetur adipiscing elit
- Aliquam blandit faucibus nisi, sit amet dapibus enim tempus
  - Lorem ipsum dolor sit amet, consectetur adipiscing elit
  - Nam cursus est eget velit posuere pellentesque
- Nulla commodo, erat quis gravida posuere, elit lacus lobortis est, quis porttitor odio mauris at libero
- 1 Nam cursus est eget velit posuere pellentesque
- 2 Vestibulum faucibus velit a augue condimentum quis convallis nulla gravida



# Blocks of Highlighted Text

#### **Block Title**

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer lectus nisl, ultricies in feugiat rutrum, porttitor sit amet augue.

### **Example Block Title**

Aliquam ut tortor mauris. Sed volutpat ante purus, quis accumsan.

#### Alert Block Title

Pellentesque sed tellus purus. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos.

Suspendisse tincidunt sagittis gravida. Curabitur condimentum, enim sed venenatis rutrum, ipsum neque consectetur orci.

## Multiple Columns

Subtitle

### Heading

- Statement
- 2 Explanation
- 3 Example

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Integer lectus nisl, ultricies in feugiat rutrum, porttitor sit amet augue. Aliquam ut tortor mauris. Sed volutpat ante purus, quis accumsan dolor.

## Table

Subtitle

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table: Table caption



Figure: Creodocs logo.

# **Definitions & Examples**

#### Definition

A prime number is a number that has exactly two divisors.

#### Example

- 2 is prime (two divisors: 1 and 2).
- 3 is prime (two divisors: 1 and 3).
- 4 is not prime (three divisors: 1, 2, and 4).

You can also use the theorem, lemma, proof and corollary environments.

# Theorem, Corollary & Proof

## Theorem (Mass-energy equivalence)

 $E = mc^2$ 

## Corollary

$$x + y = y + x$$

#### Proof.

$$\omega + \phi = \epsilon$$



## Equation

$$\cos^3\theta = \frac{1}{4}\cos\theta + \frac{3}{4}\cos 3\theta \tag{1}$$

### Verbatim

### Example (Theorem Slide Code)

```
\begin{frame}
\frametitle{Theorem}
\begin{theorem} [Mass--energy equivalence]
$E = mc^2$
\end{theorem}
\end{frame}
```

Slide without title.

## Citing References

An example of the \cite command to cite within the presentation:

This statement requires citation [Smith, 2022, Kennedy, 2023].

#### References



John Smith (2022) Publication title Journal Name 12(3), 45 – 678.



Annabelle Kennedy (2023) Publication title Journal Name 12(3), 45 – 678.

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