FFTs in Graphics and Vision

Michael Kazhdan

(600.660)
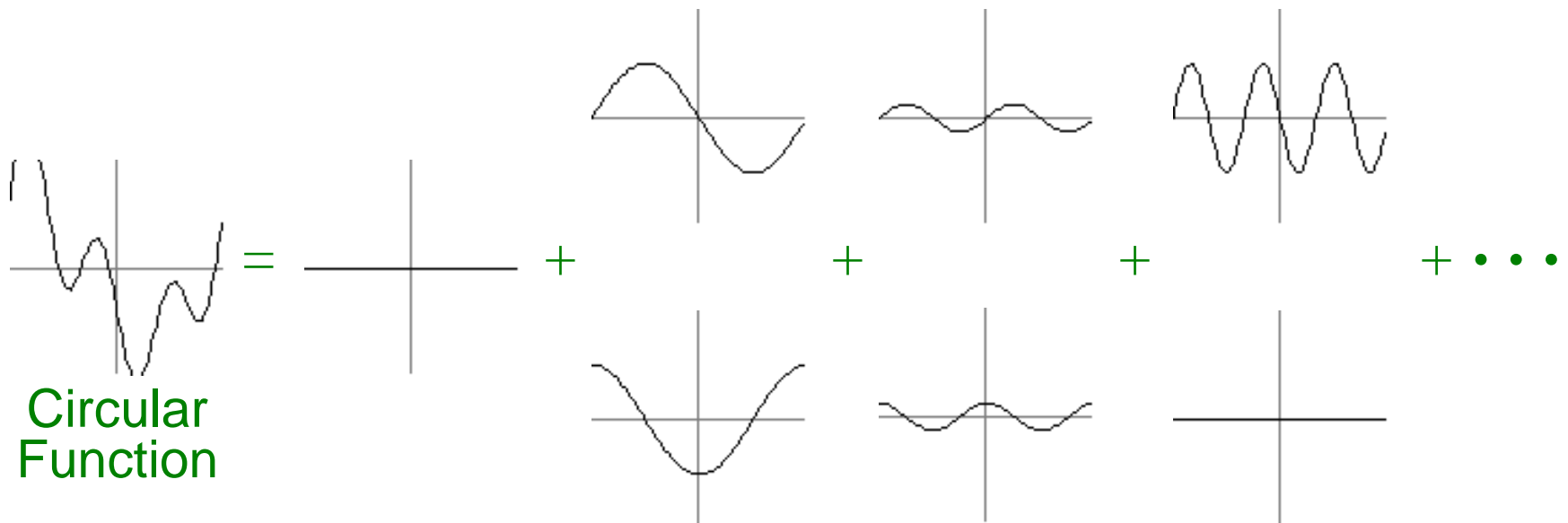
What are we studying?

- Signal Processing

- Representation Theory

- Alignment

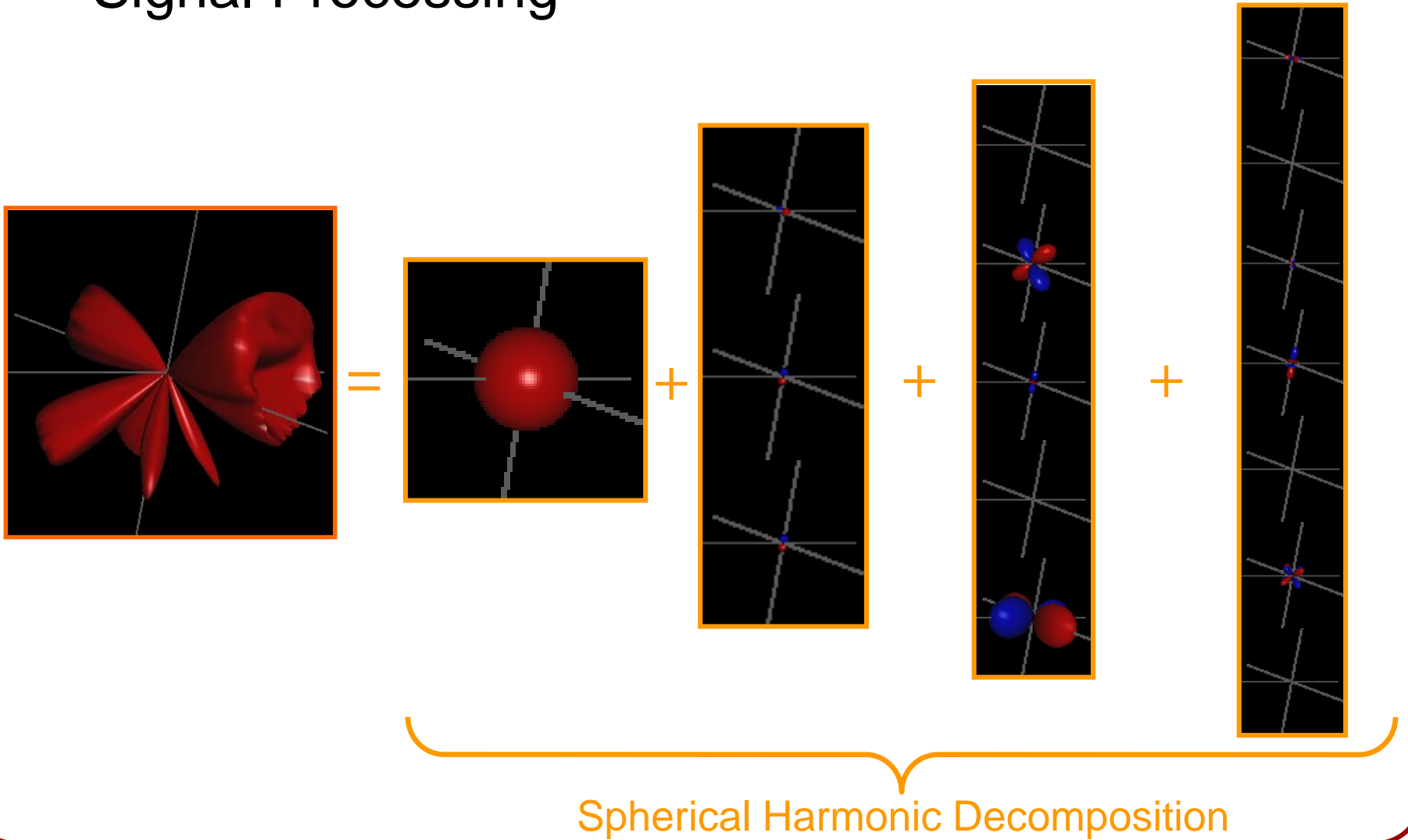- Symmetry Detection

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Circular Function = + + + + • • •

Cosine/Sine Decomposition

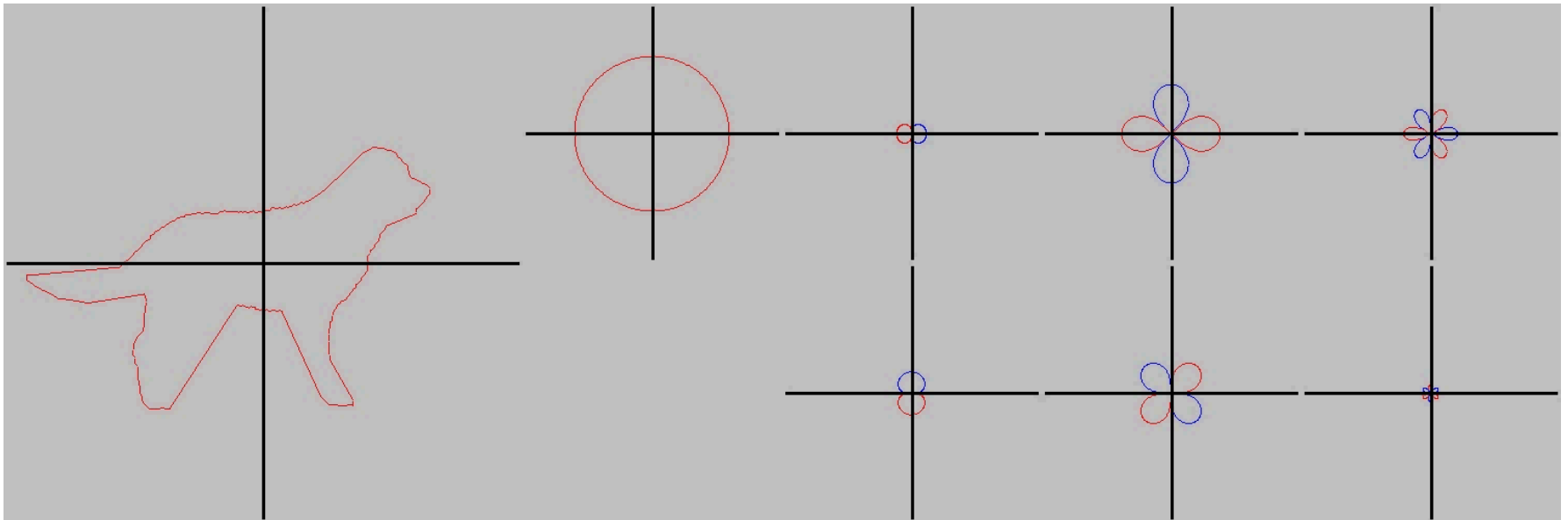# What are we studying?

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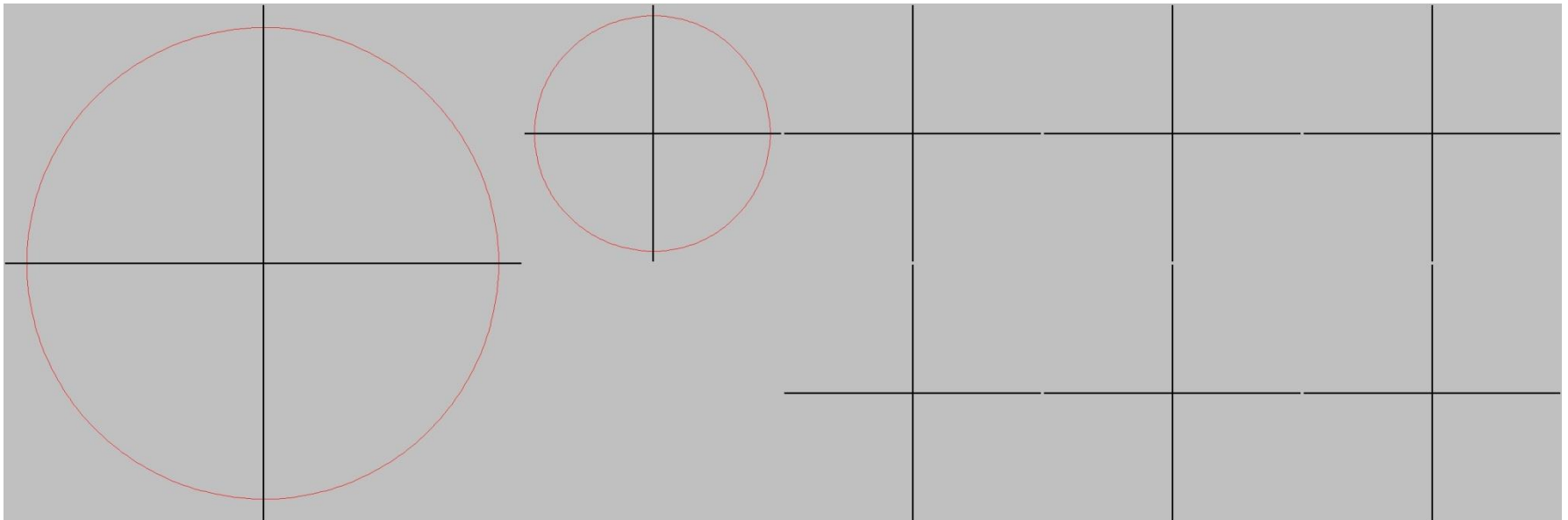Spherical Harmonic Decomposition

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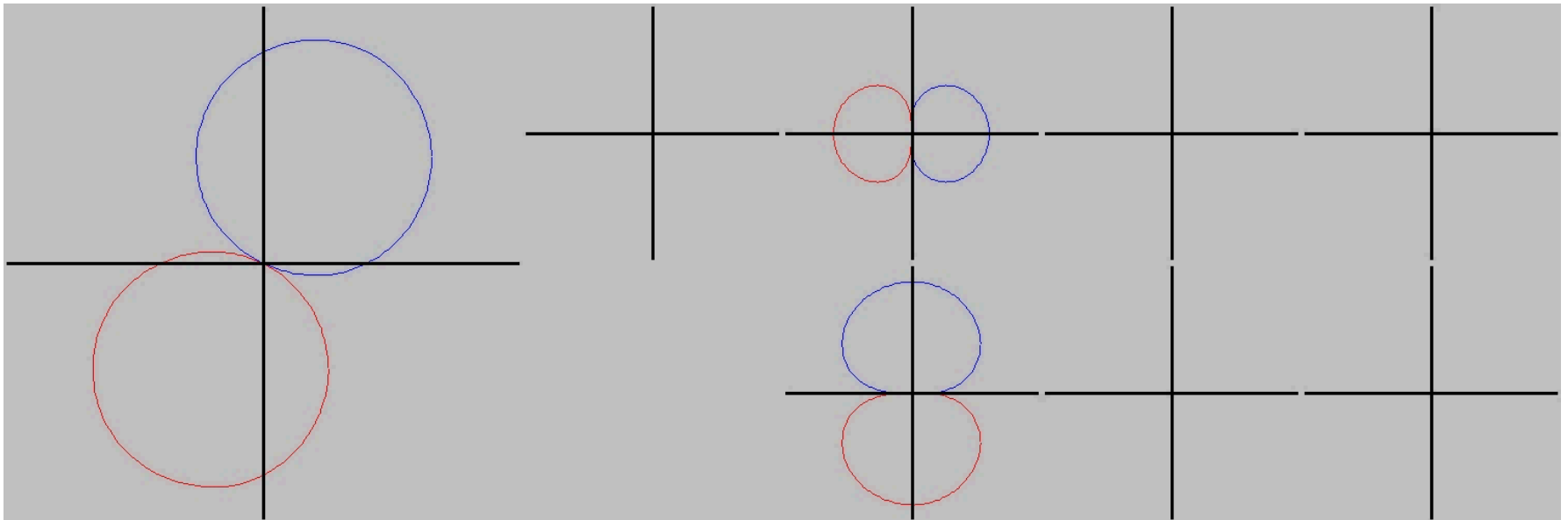- Representation Theory
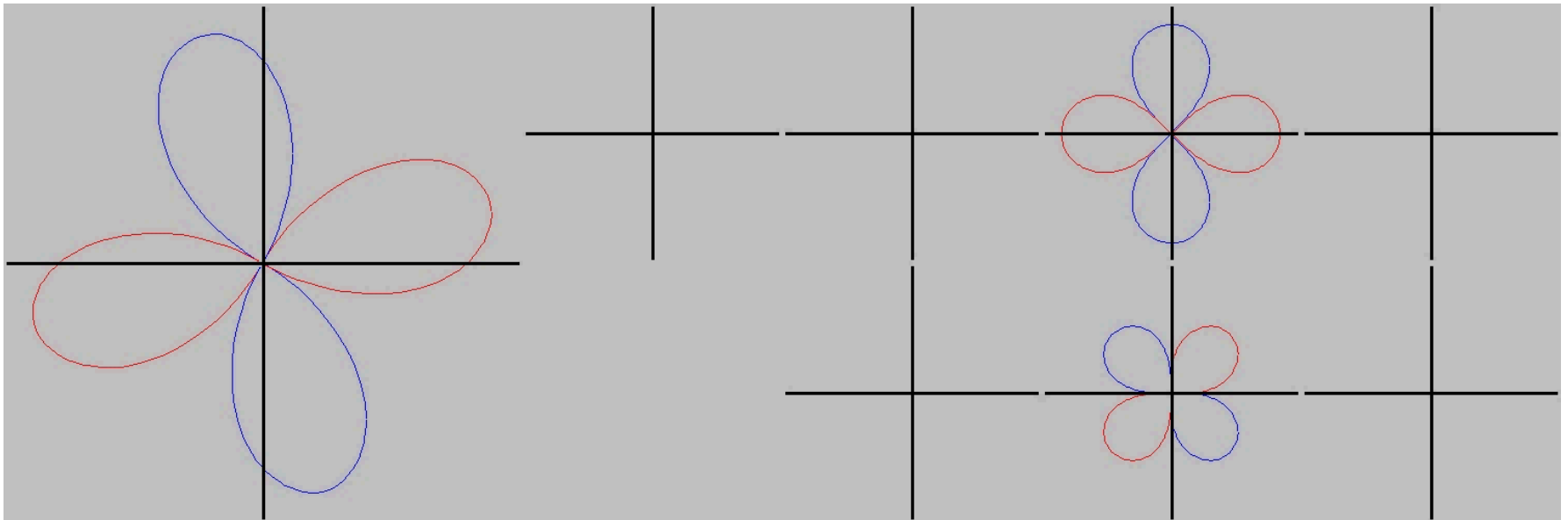
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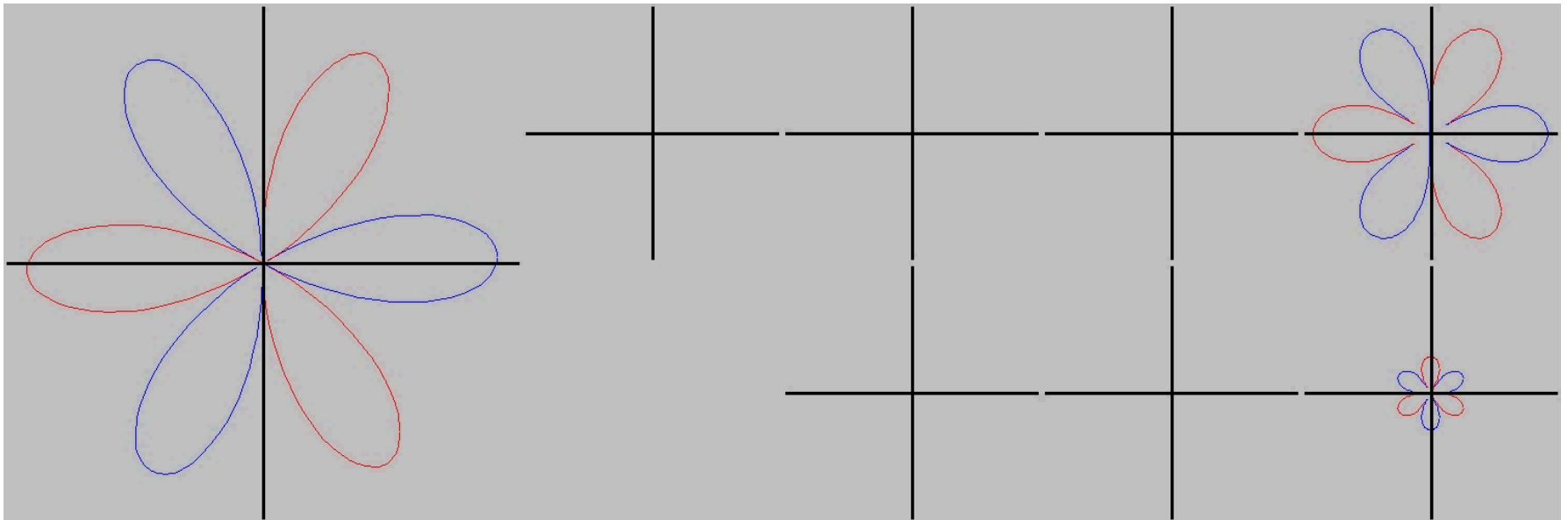
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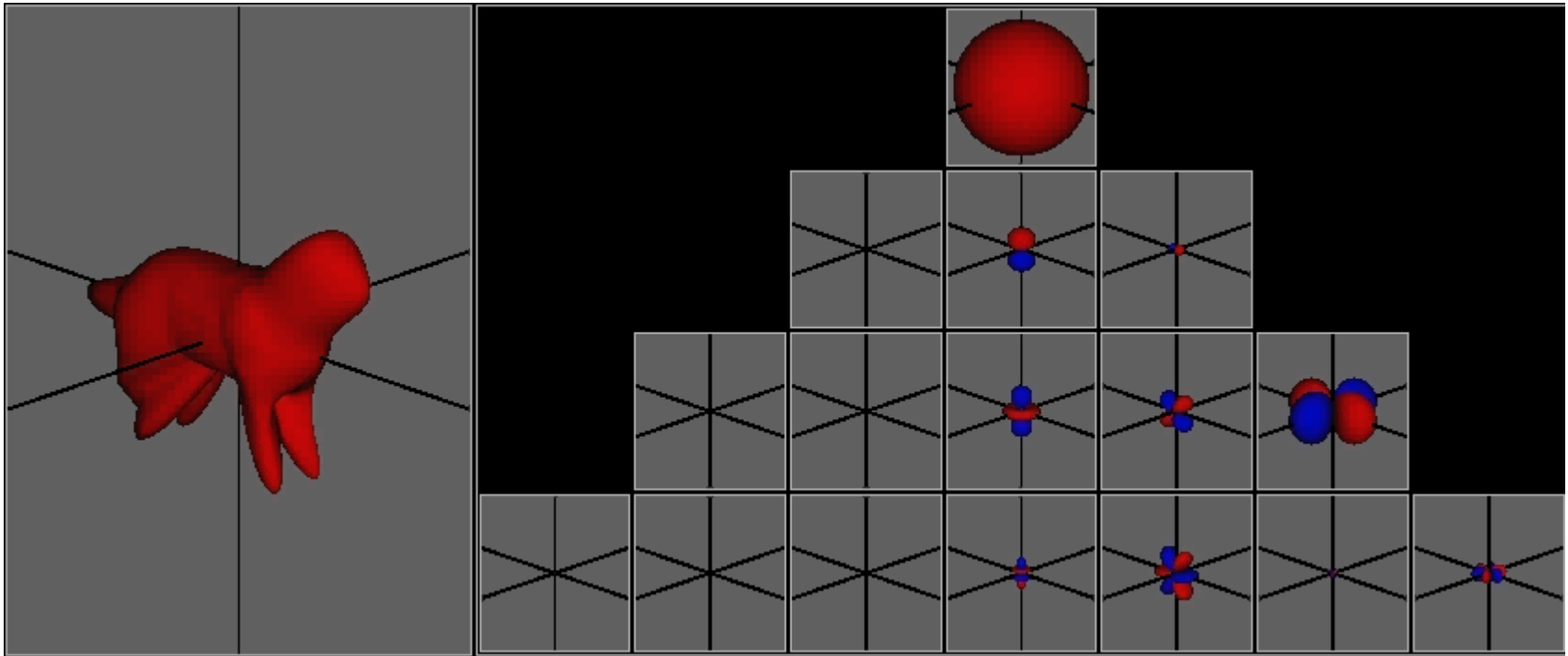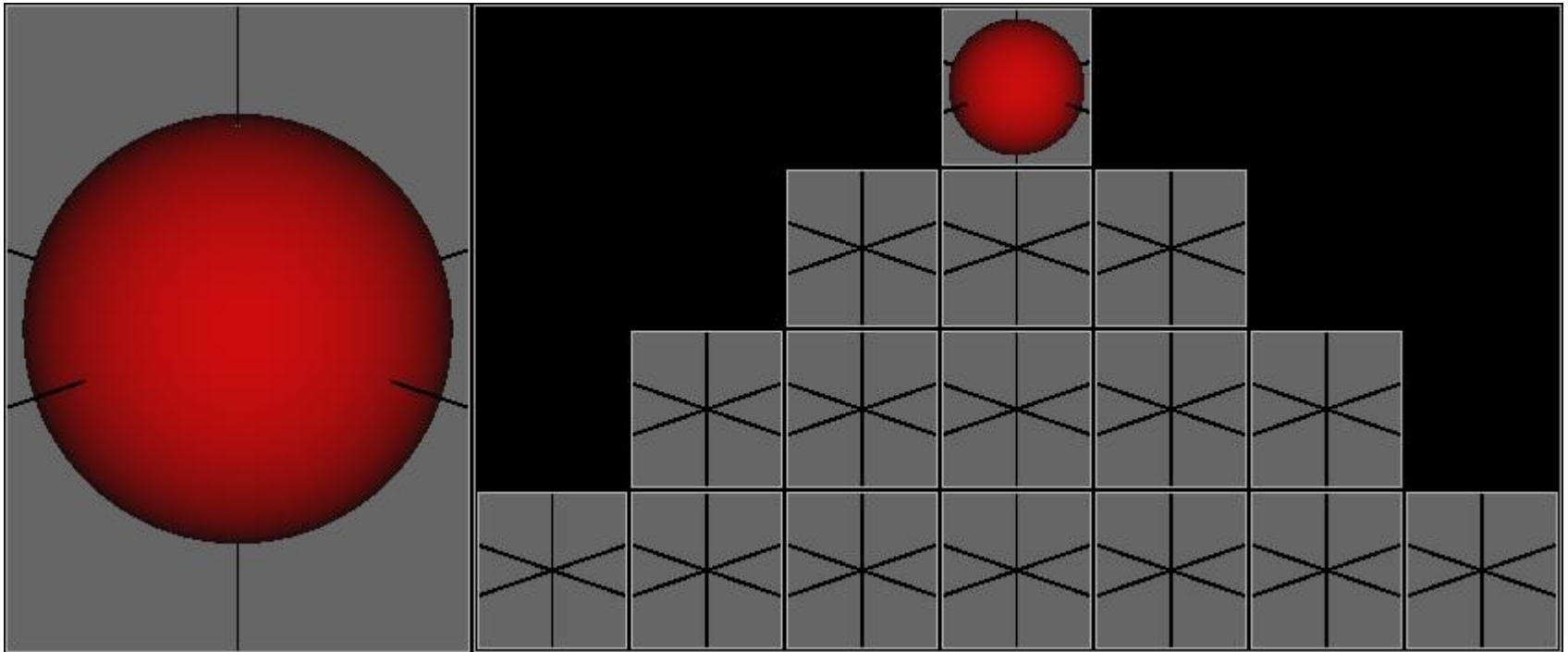- Representation Theory

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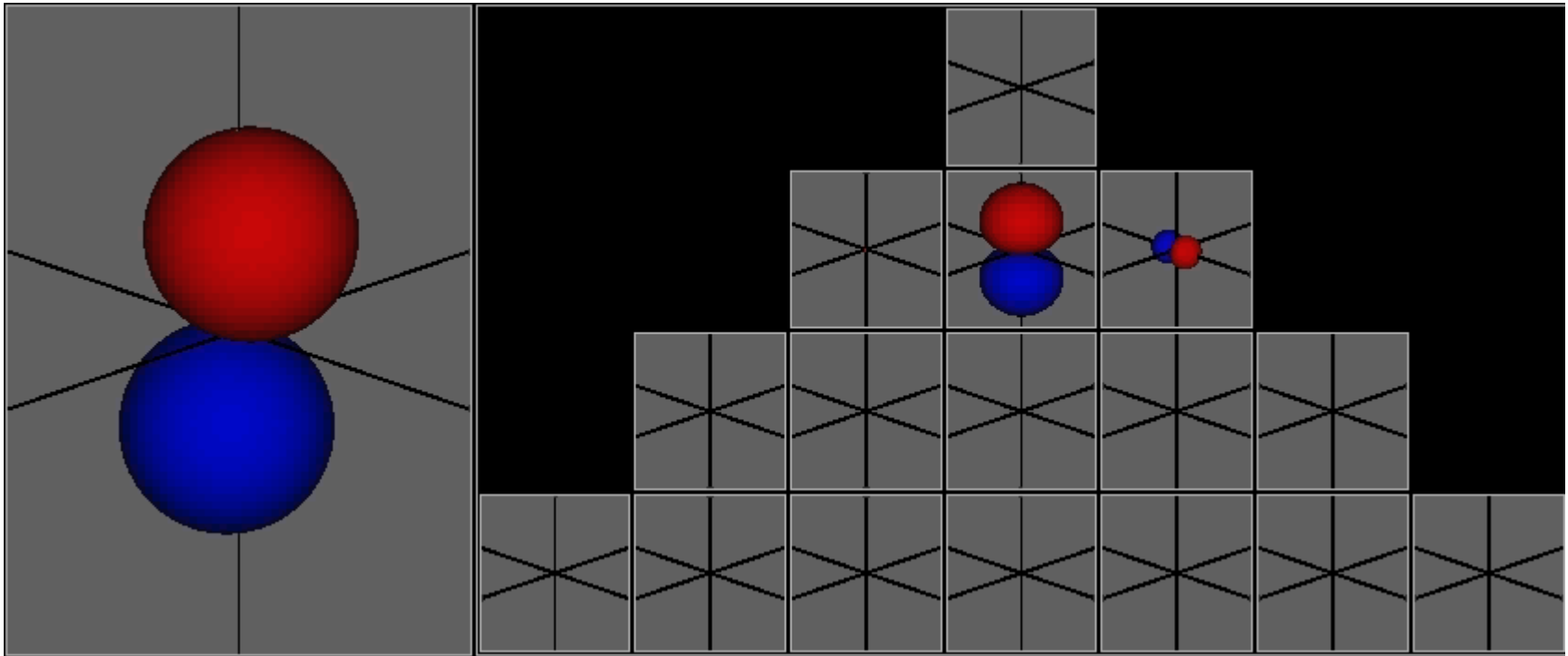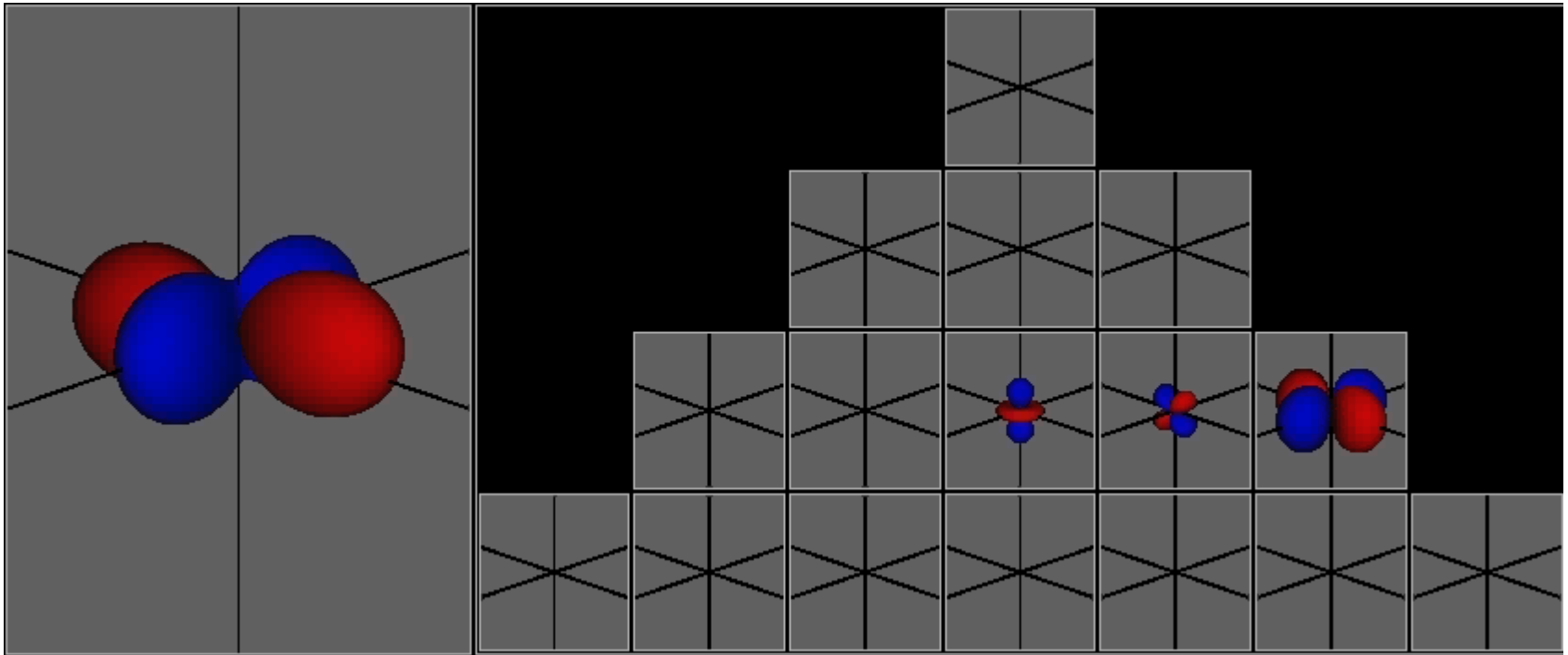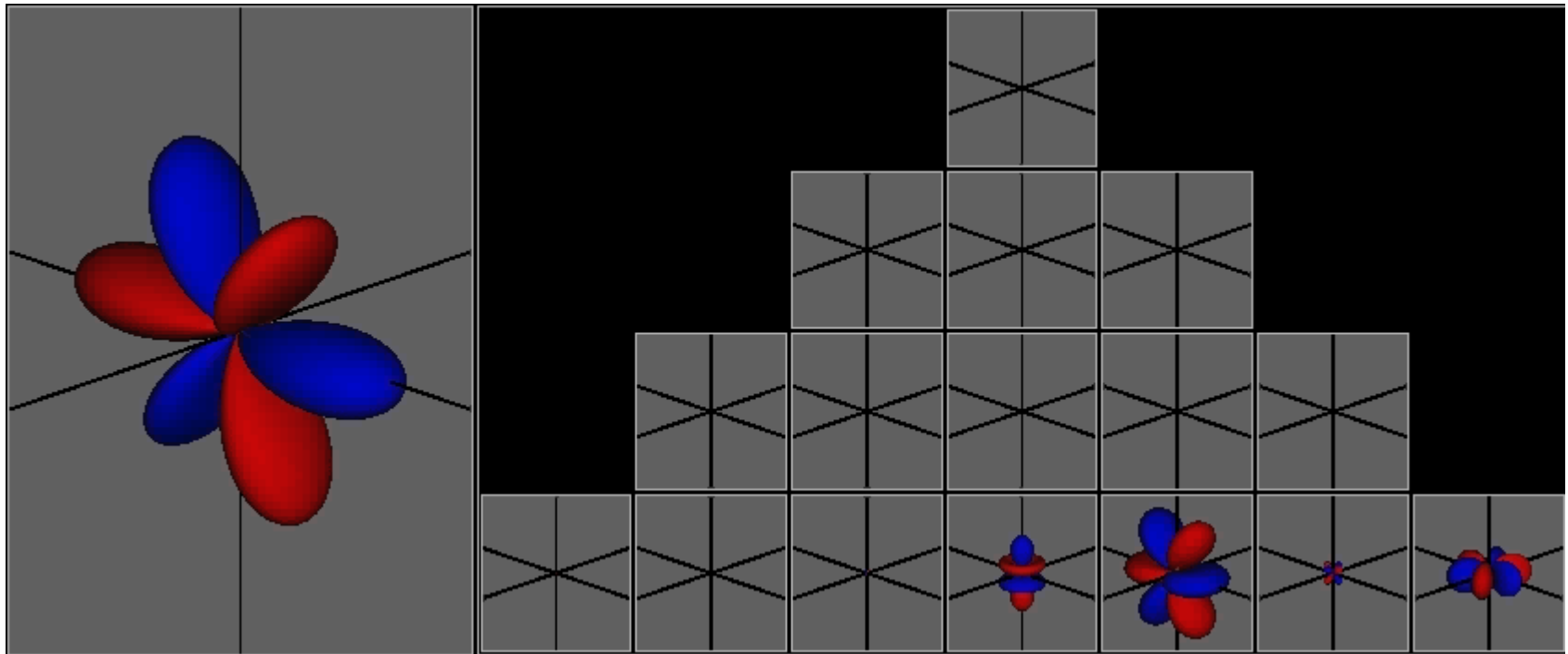- Representation Theory

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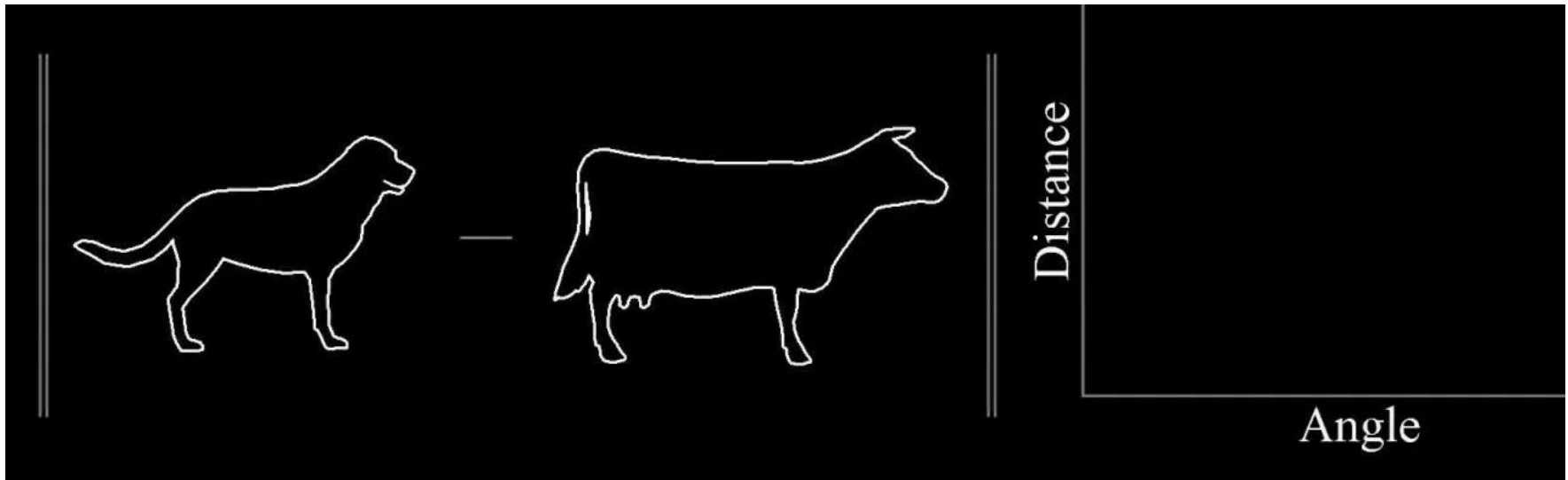- Representation Theory

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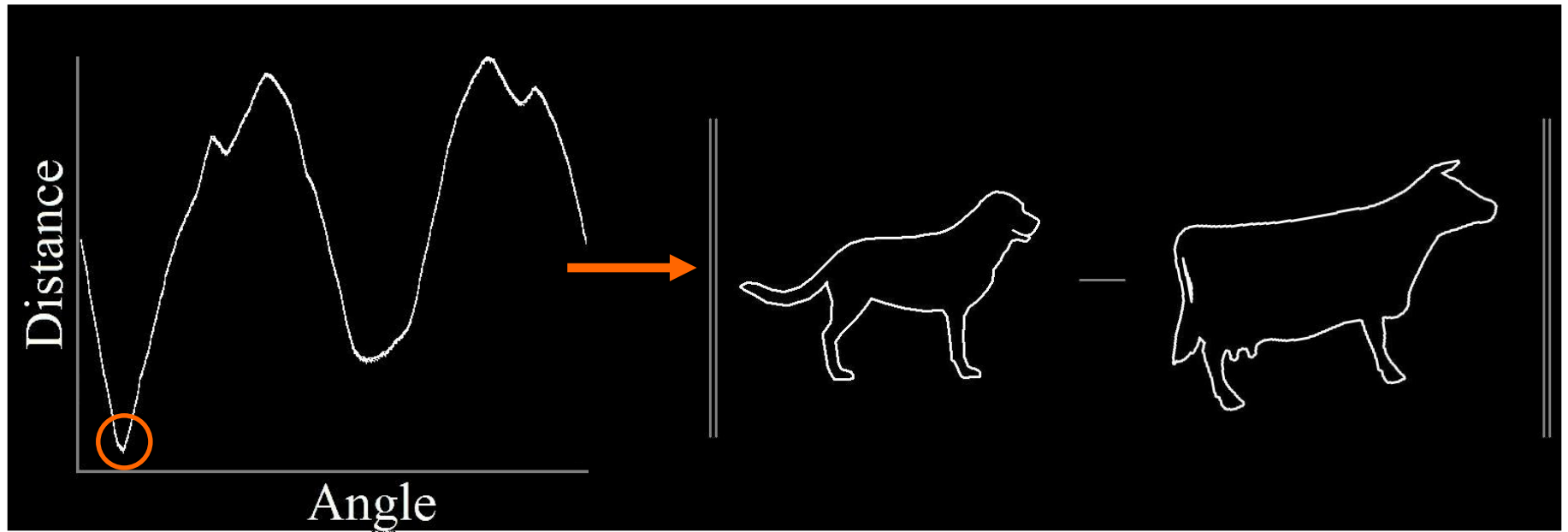- Signal Processing

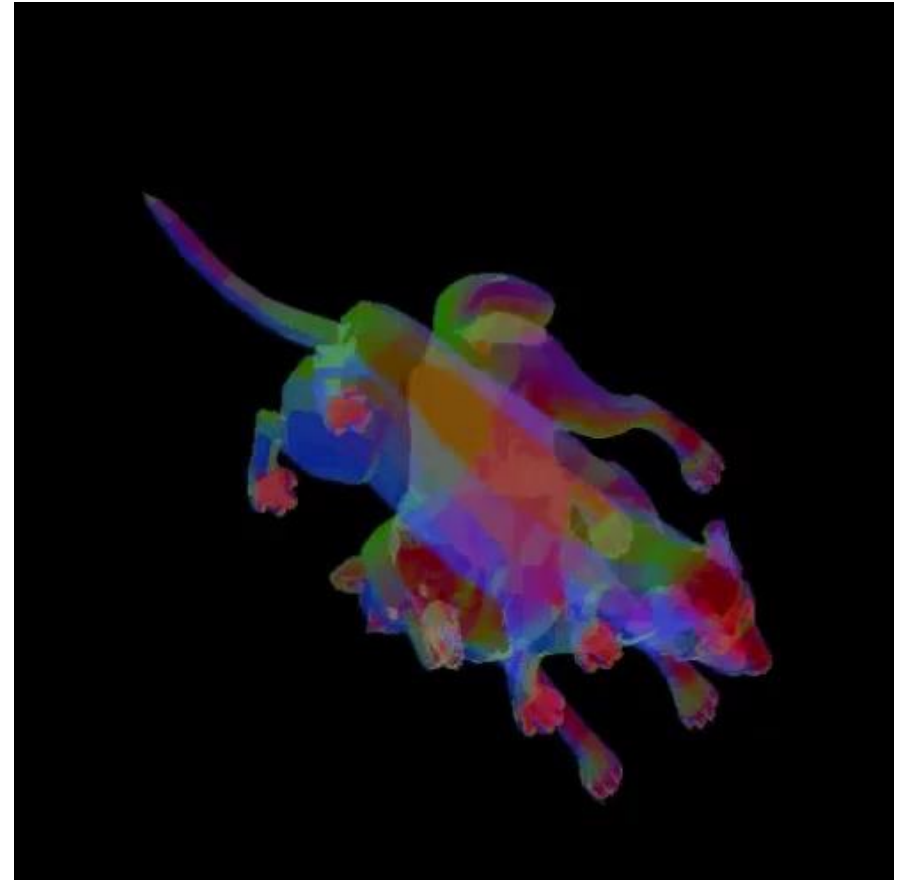- Representation Theory

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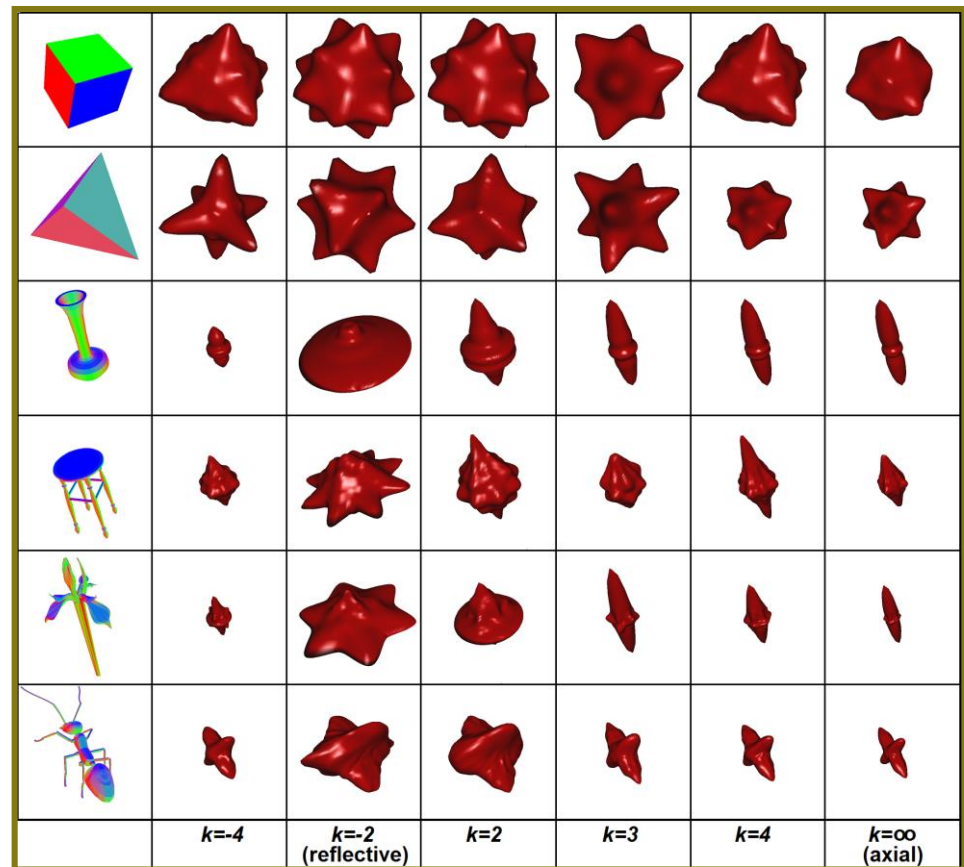
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- Symmetry Detection

| | k=-4 | k=-2 (reflective) | k=2 | k=3 | k=4 | k=∞ (axial) |

What We Will Cover

Some basic algebra
- Representation Theory
- Commutative Groups
  - » Schur's Lemma

Signals on a circle / torus
- Fourier Transform
- Convolution/Correlation
  - » Smoothing, Differentiation, etc.

Signals on a sphere
- Spherical Harmonic Transform
- Wigner-D Transform
- Convolution/Correlation
  - » Smoothing, Differentiation, etc.

What I Expect of You

Homework:

A code-base will be provided.

Assignments will focus on implementation.

Doing the homework assignments is how you will learn (half the material)!

Presentations:

There will be no student presentation in the course.

Exams:

There will be no exams.

Readings:

There is no text book.

Class notes will be posted.

Supplementary readings will be suggested.

Miscellany

Class Cancellation:

Monday, March 2nd.

Wednesday, March 4th .

Monday, April 6th.

Wednesday, April 8th.