

# ♣ ILM : Interactive Learning Module

*Companion (MS-Windows) for*

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## *Parallel Coordinates: Visual Multidimensional Geometry and Its Applications*

Springer New York 2009

Interactive software for self-study, experimentation and class demonstrations with pointers and guidance given at “milestones” throughout the text.

♠ ILM-1 contains:

1. *Projective geometry*
2. *Point*  $\leftrightarrow$  *line* duality in  $\parallel$ -coords
  - Why use the projective plane with  $\parallel$ -coords
  - Key properties of the duality, and
  - Transformation duality (*translation*  $\leftrightarrow$  *rotation*)
3. *Multidimensional lines*
  - Construction from two points
  - Representation by points with two indices
  - Properties of indexed points
4. *Planes & Hyperplanes*
  - Coplanarity of points on a grid
  - Representing hyperplanes by vertical lines
  - Representing hyperplanes by multiply indexed points

♠ ILM-2 contains: *rotation*  $\leftrightarrow$  *translation* duality in 3-D (rotation of a plane about a line)

- based on the vertical line representation of planes, and also
- the indexed points representation of planes.

The ILM-2 highlights the remarkable properties of indexed points.