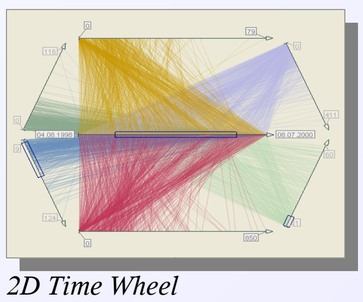
3D Axes-Based Visualizations for Time Series Data

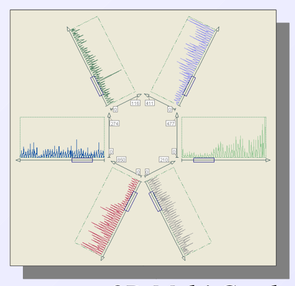
Christian Tominski[1], James Abello[2], and Heidrun Schumann[1]

Poster Overview

- **Goal**: Expressive visualization of multivariate time series data
- Various approaches for expressive representation of:
  - Time series (e.g. diagram techniques, spiral displays)
  - Multivariate data (e.g. axes-based visualization techniques like Parallel or Star Coordinates
- **Challenges**:
  - Effective visualization of multiple time-dependent parameters with different value ranges
  - Emphasis on parameter time
  - 3 dimensional representation
- **Presented Approach**:
  - Combination of advantages of common diagram techniques and axes-based techniques for multivariate time series data



2D Time Wheel
Tominski, Abello, Schumann, 2003



2D Multi Comb
Tominski, Abello, Schumann, 2004

Novel 3D Axes Arrangements for Visualizing Time Series Data

Basic Idea

- Centrally exposed time axis
- Radially arranged axes representing time-dependent variables (semi-transparent planes, so called “data wings”, to support visual separability of different variables)

3D Time Wheel

- Line segments connect time steps and corresponding variable values

3D Multi Comb

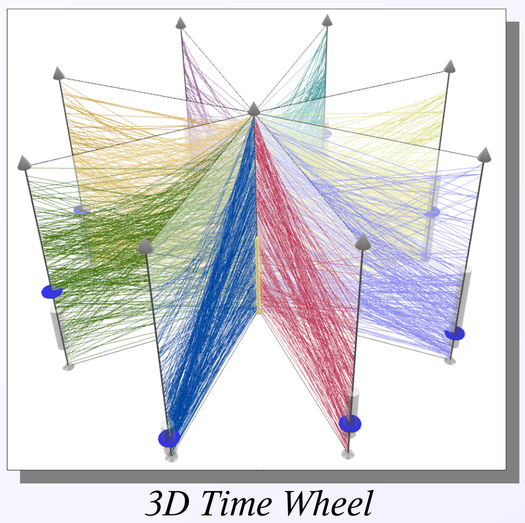
- Time plots represent time dependent variables

3D Kiviat Tube

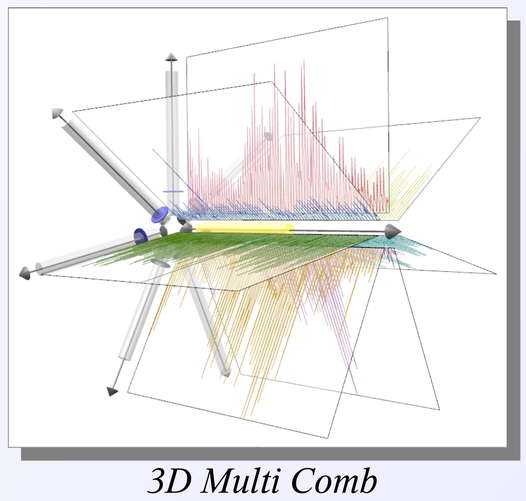
- Extruded Kiviat graph represents inter variable dependencies

Interaction

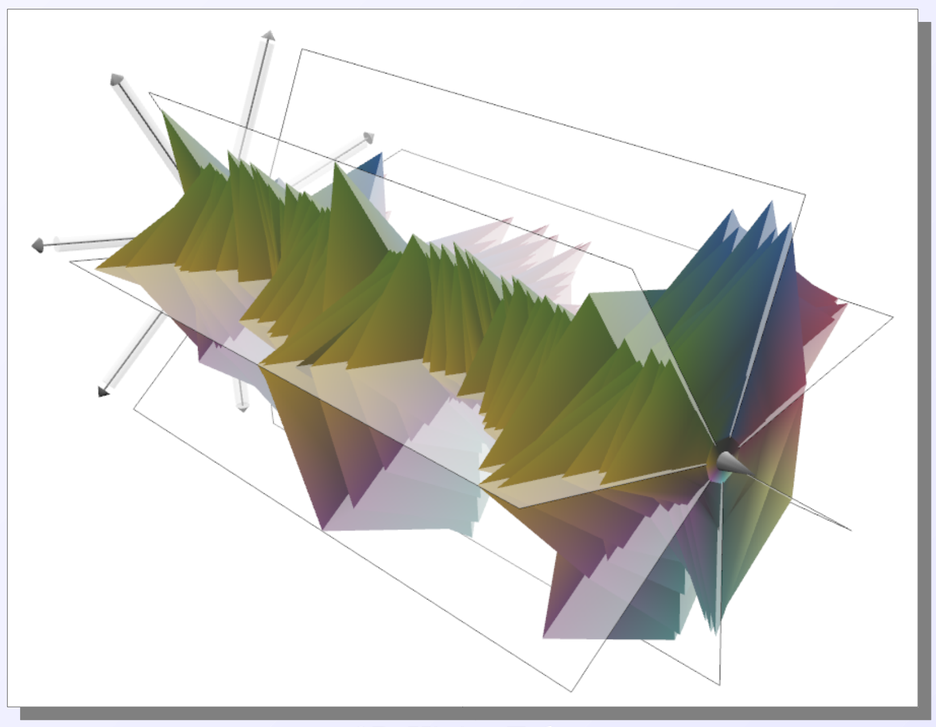
- Common 3D transformations
- Different interactive axis types
- Special interaction technique “Folder Style”



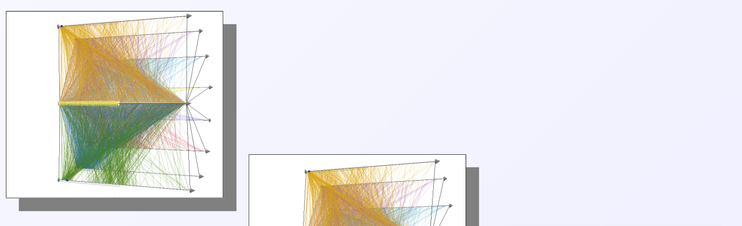
3D Time Wheel

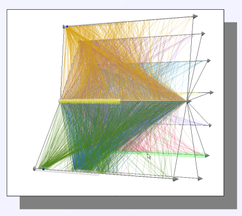


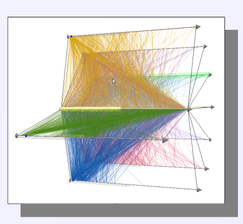
3D Multi Comb



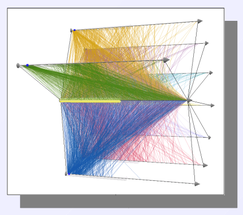
3D Kiviat Tube

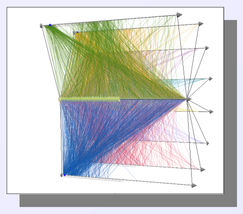


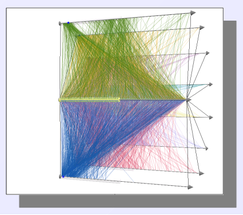




Folder Style







[1]Institute for Computer Science
University of Rostock
Germany
{ct,schumann}@informatik.uni-rostock.de

[2]DIMACS
Rutgers University
USA
abello@dimacs.rutgers.edu