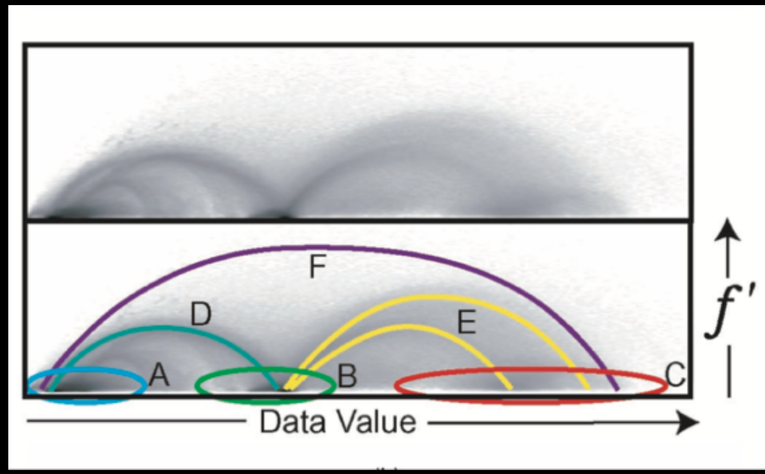
Multidimensional Transfer Functions

- Not often used
- Examples
  - f vs ||∇f||
  - f vs ||∇f|| vs (1 / ||∇f||²) ∗ (∇f)T ∗ **H**f ∗ ∇f
  - Principle curvature



Kniss, Kindlmann, Hansen, 2002
Multidimensional Transfer Functions
for Interactive Volume Rendering

Lighting models

- Local lighting models similar to OpenGL lecture (Blinn-Phong)
- Problem: Since it is **direct** volume rendering, no explicit surface exists, therefore no normal
- -> replacement: gradient ∇f as replacement for the normal in lighting calculations
- Approximations of ∇f using finite differences
  - Forward difference, backward difference, *central difference*
  - Central difference:
    - f'(x,y,z) = f(x+h, y, z) - f(x-h, y, z),
      f(x, y+h, z) - f(x, y-h, z),
      f(x, y, z+h) - f(x, y, z-h)