OUTLINE:
3-WAY 2-MODE DATA ANALYSIS

MAIN REF: Arabie, Carroll, DeSarbo 1987, QASS 65)

A: Carroll-Chang Individual Differences Scaling Model

(INDSCAL)

- Model (see TUG and UM4App2)
- Procedure (Convert; Strain; ALS decomposition)
- Solution:

  Group Space: Unique orientation; corr. Dims,

  Subjects Space: Vectors;

  Disjoint in common dimensionality

  Private Spaces: derived by applying SS to GS
- Examples
- Other representations of subject weights: Ratio; “flattened” (FY)

B: Young Alternating Least Squares Individual Differences Scaling (ALSCAL)

- ONLY distance models
- S-Stress vs
- Stress and Large distances: Distortion (Ramsay)
- Has <u>non-metric</u> INDSCAL
- S-INDSCAL outperforms ALSCAL (Weinberg & Menil 1993)

Therefore prefer S-INDSCAL, and MLE/PROXSCAL-to-be in SPSS

C: Hierarchies of Distance Models

- Carroll: IDIOSCAL-INDSCAL-KYST
- Ramsay: MLE MULTISCALE: M1-M2-M3/INDSCAL

  Multiple Functions (Splines); Error Theory; Confidence Ellipses

INDSCAL PROCEDURE (C&C)

1. (Pre-processing stage):

Each subject's (interval) dis/similarity matrix of "distances" is converted to scalar-products form (see Coxon 1982, A5.2 p149). **) -> #**

2. 3W version of SVD ("Canonical Decomposition")

which minimizes "STRAIN" :

STRAIN (3W):

$$STRAIN = \sum_i \sum_j \sum_k (b^i_{jk} - \hat{b}^i_{jk})^2 = \sum_i STRAIN_i$$

3. Post-normalization:

(a) subject's scalar-products, SS=1

$$\sum_j \sum_k (b^i_{jk})^2 = 1, \text{for all i,}$$

$$\text{and } \hat{b}^i_{jk} = \sum_{r=1} \hat{w}_{ij} \hat{x}_{jr} \hat{x}_{kr}$$