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| **Disjoint** **PCA** (Vichi, Saporta 2009)  **X** = **YA**' + **E**1 with **Y**=**XA**  subject to   1. (1) (*k*=1, …, *K*) 2. (2)(*k*=1,…,*K-*1; *r*=*k*+1,…,*K*)   (3) , (*j =* 1,…,*n*)  **LS estimation Y=XA**  *min* ||**X** - **YA**'||2 = max *tr*(**ΣY**)  subject to (1), (2) and (3)  reparameterizing **A**=**BV**  max *tr***(ΣY**) = max *tr*(**V**'**BΣXBV**)  subject to  **V** =[*vjk* ∈ {0,1}] (binary)  **V1***K* = **1***J* (row stochastic)  **B** = *diag*(*b*1, …,*bJ*) (diagonal)  **V**′**BBV** = **I***K* (orthogonal) | ***K*-means**  **Y** = **U** + **E**2  subject to  **U** =[*uip* ∈ {0,1}] (binary)  **U1***P* = **1***n* (row stochastic)  **Clustering & Disjoint PCA**  **X** = (**U** + **E**2)**A**' + **E**1  rewriting **E** = **E**2**A**' + **E**1 and being **A**=**BV**  **X** = **UV**'**B** + **E**  subject to  **U** =[*uip* ∈ {0,1}] (binary)  **U1***P* = **1***n* (row stochastic)  **V** =[*vjk* ∈ {0,1}] (binary)  **V1***K* = **1***J* (row stochastic)  **B** = *diag*(*b*1, …,*bJ*) (diagonal)  **V**′**BBV** = **I***K* (orthogonal) |