

$$\begin{array}{c|c|c|c|c|c}
 \boxed{\begin{matrix} & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \end{matrix}} & \boxed{\begin{matrix} & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \end{matrix}} & = & \approx & \boxed{\begin{matrix} & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \end{matrix}} & = \\
 \begin{matrix} {}^1\mathbf{X}_{IJ} \end{matrix} & \begin{matrix} {}^1\mathbf{W}_{JR} \end{matrix} & & & & \begin{matrix} {}^2\mathbf{X}_{IJ} \end{matrix} \\
 & & & & & \boxed{\begin{matrix} & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \end{matrix}} & \boxed{\begin{matrix} & \\ & \\ & \\ & \\ & \\ & \\ & \end{matrix}} & & & \begin{matrix} {}^2\mathbf{W}_{JR} \end{matrix}
 \end{array}$$

$${}^1\mathbf{X}_{IJ} {}^1\mathbf{W}_{JR} = {}^1\mathbf{Y}_{IR} \quad {}^2\mathbf{Y}_{IR} = {}^2\mathbf{X}_{IJ} {}^2\mathbf{W}_{JR}$$

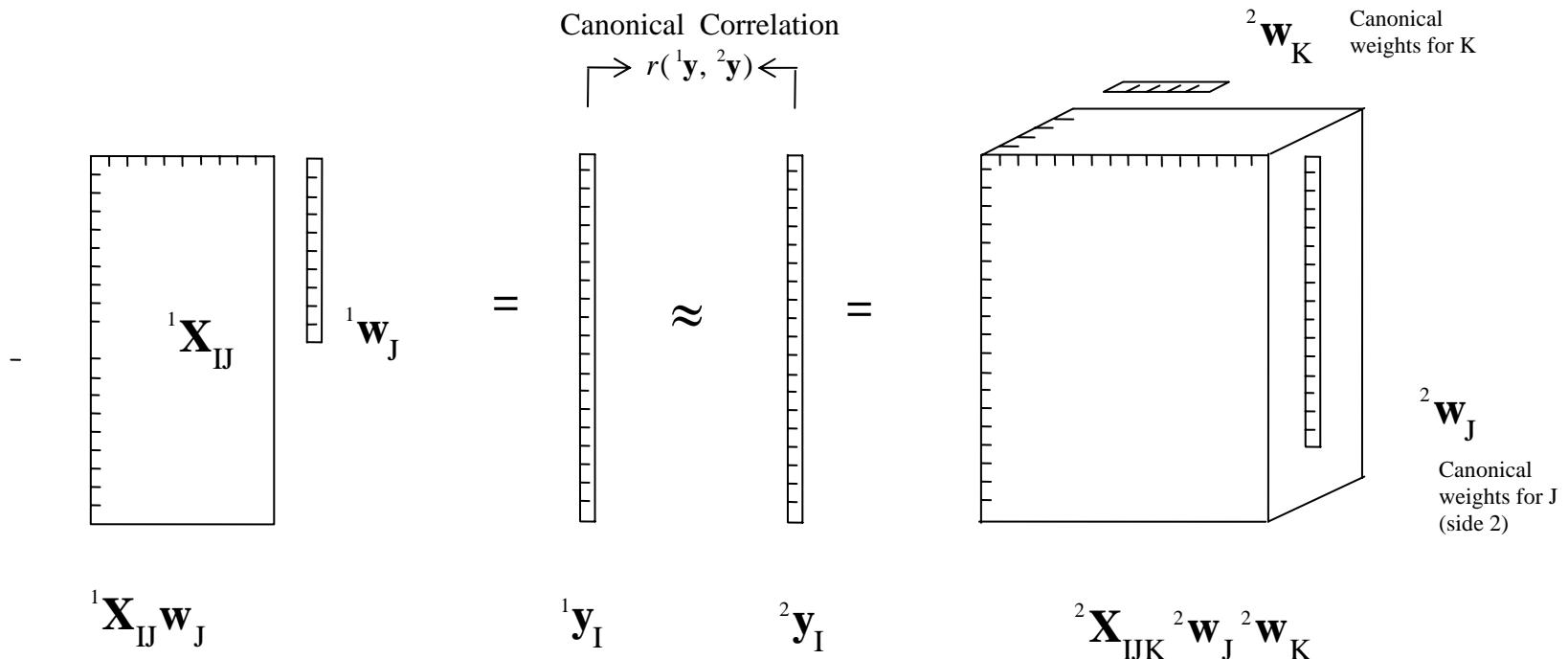
Left side
source data
matrix Left side
canonical
weight matrix

Left
Canonical
variates

Right
Canonical
variates

Right side
source data
matrix Right side
canonical
weight matrix

“Level 0”: Standard Canonical Correlation:
2 matrices, 1 shared mode, **2CCs**



Left side source- data matrix	Left side canonical weights	Left canonical variate	Right canonical variate	Right side source- data <i>array</i>	Right side canonical weights for J	Right side canonical weights for K
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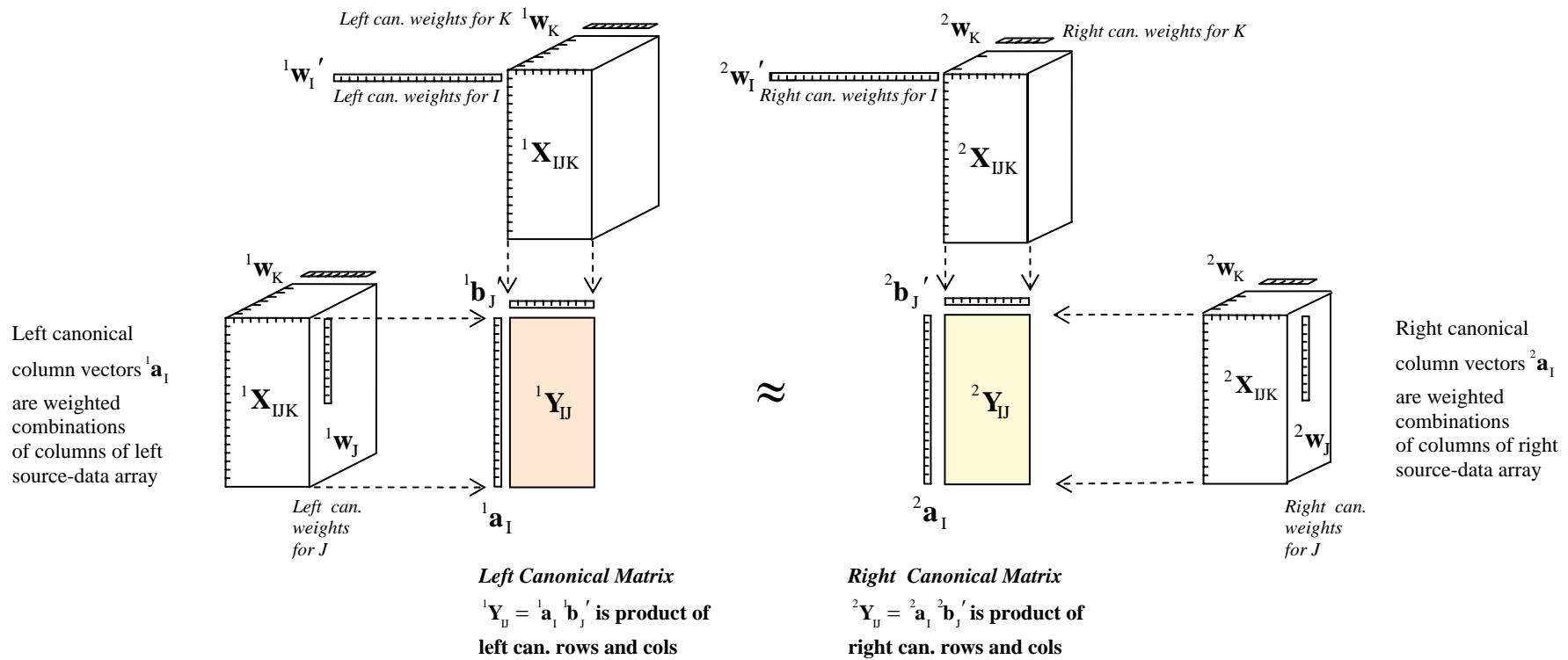
Multilinear Canonical Correlation (PARACCON /TUCCON): Level 1a.
 Multilinear canonical-weights applied to 3-way data array (here on just one side)

Left canonical row vectors

${}^1\mathbf{b}_j'$ are weighted
combinations of rows of
left source-data array

Right canonical row vectors

${}^2\mathbf{b}_j'$ are weighted
combinations of rows of
right source-data array



$$({}^1\mathbf{X}_{IJK} {}^1\mathbf{w}_J {}^1\mathbf{w}_K) \otimes ({}^1\mathbf{X}_{IJK} {}^1\mathbf{w}_I {}^1\mathbf{w}_K) = {}^1\mathbf{a} {}^1\mathbf{b}' = {}^1\mathbf{Y}_{IJ} \approx {}^2\mathbf{Y}_{IJ} = {}^2\mathbf{a} {}^2\mathbf{b}' = ({}^2\mathbf{X}_{IJK} {}^2\mathbf{w}_J {}^2\mathbf{w}_K) \otimes ({}^2\mathbf{X}_{IJK} {}^2\mathbf{w}_I {}^2\mathbf{w}_K)$$

ML-CC Level 2b: ML canonical objects, ML canonical weights, and ML source data (1 CC)