Comparison Table

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Method	Model	# of features	non-Gaussian
STD (Ours)	$\mathbb{E}[\mathcal{Y}] = f(\mathcal{B} imes \{oldsymbol{X}_1, oldsymbol{X}_2, oldsymbol{X}_3\}), \mathcal{B} = \mathcal{C} imes \{oldsymbol{M}_1, oldsymbol{M}_2, oldsymbol{M}_3\}$	3	
${\bf Double\text{-}core}[1]$	$\mathbb{E}[\mathcal{Y}] = \mathcal{B}, \mathcal{B} = (\mathcal{G} + \mathcal{H}) imes \{oldsymbol{M}_1, oldsymbol{M}_2, oldsymbol{M}_3\}$	0	$\sqrt{}$
GCP[4]	$\mathbb{E}[\mathcal{Y}] = f(\llbracket oldsymbol{A}_1, oldsymbol{A}_2, oldsymbol{A}_3 rbracket)$	0	$\sqrt{}$
CP-APR[3]	$\mathbb{E}[\mathcal{Y}] = f(\llbracket oldsymbol{A}_1, oldsymbol{A}_2, oldsymbol{A}_3 rbracket)$	0	Poi Only
CORALS[2]	$\mathbb{E}[\mathcal{Y}] = f(\llbracket oldsymbol{A}_1, oldsymbol{A}_2, oldsymbol{A}_3 rbracket)$	0	$\sqrt{}$
SupCP[6]	$\mathcal{Y} = \llbracket oldsymbol{A}_1, oldsymbol{A}_2, oldsymbol{A}_3 rbracket + \mathcal{E}, oldsymbol{A}_1 = oldsymbol{X} oldsymbol{B} + \mathcal{E}'$	1	×
mRRR[14]	$\mathcal{Y}_{ijk} \sim \exp \operatorname{fm}(\theta_{ijk}, \phi), \theta_{ijk} = f(\boldsymbol{X}\boldsymbol{B}), \operatorname{rank}(\boldsymbol{B}) = r$	1	and mixed
Envelope[5]	$\mathcal{Y} = \mathcal{B} \times_3 \mathbf{X} + \mathcal{E}, \mathcal{B} = \mathcal{C} \times \{\Gamma_1, \Gamma_2, \mathbf{I}_d\}, \operatorname{Cov}(\mathcal{E}) = \Sigma_1 \otimes \Sigma_2$	1	×
$\operatorname{GLSNet}[12]$	$\mathbb{E}[\mathcal{Y}] = f(\Theta + \mathcal{B} \times_3 \mathbf{X}), \text{rank}(\Theta) = r, \ \mathcal{B}\ _0 = s$	1	$\sqrt{}$
STORE[7]	$\mathcal{Y} = \mathcal{B} imes_3 oldsymbol{X} + \mathcal{E}, \mathcal{B} = \llbracket oldsymbol{A}_1, oldsymbol{A}_2, oldsymbol{A}_3 rbracket, \lVert oldsymbol{A}_k rbracket_0 \leq s_k$	1	×
$\operatorname{Han}[10]$	$y_i = \langle \mathcal{B}, \mathcal{X}_i angle + \epsilon, \mathcal{B} = \mathcal{C} imes \{oldsymbol{M}_1, oldsymbol{M}_2, oldsymbol{M}_3 \}$	3	×
Garvesh[8]	$y_i = \langle \mathcal{B}, \mathcal{X}_i \rangle + \epsilon, \mathcal{B}$ various structures	3	×
STAR[9]	$\mathcal{Y}_{ijk} = \mathcal{T}(\mathcal{X}_i) + \epsilon, \mathcal{T}(\mathcal{X}_i) \approx \sum_{m}^{M} \langle \mathcal{B}_m, \mathcal{F}_m(\mathcal{X}_i) \rangle, \mathcal{B}_m \text{ CP sparse}$	3	×

Method	Sparsity	non-i.i.d. noise	Algo	Algo guarantee	Complexity	Error bound
STD (Ours)	×	×	Alter/HOSVD	\checkmark	$r^3 + 3pr$	
${\bf Double\text{-}core}[1]$	×	×	ADMM	\checkmark	$r^3 + 3dr$	$\sqrt{}$
GCP[4]	$\times()$	×	BFGS	×	3dR	×
CP-APR[3]	×	×	Alter, MM	\checkmark	3dR	×
CORALS[2]		×	ALS	×	$(3dR)^*$	×
SupCP[6]	×	×	${ m EM}$	×	2dR + pR	×
mRRR[14]	×	×	Alter	\checkmark	$pr + d^2r$	$\sqrt{}$
Envelope[5]	×	\checkmark	Alter	×	$(r^2d + 2dr)^+$	$\sqrt{}$
GLSNet[12]		×	Alter GD	\checkmark	2dr + s	$\sqrt{}$
STORE[7]		×	Alter	\checkmark	$r\sum_k s_k$	$\sqrt{}$
$\operatorname{Han}[10]$	×	×	PGD	\checkmark	$r^3 + 3pr$	$\sqrt{}$
Garvesh[8]	$\times()$	×	GD	×	$(d^3)^*$	$\sqrt{}$
STAR[9]		×	Alter	×	$(3Mdr)^*$	