	Objective Function	Deconvolution Type	Solver	Marker Selection	Value	Ref
CIBERSORT	$\arg\min_{\beta,\nu,\epsilon} C\sum_m \lvert a_m - \mathbf{s}_m \cdot \beta\rvert_\epsilon + \frac{1}{2}\lvert\lvert\beta\rvert\rvert^2 + \nu\epsilon$	Reference	`svm`	Differentially-expressed (DE'ed), prioritized by fold change, not expressed in non-hematopoietic cells	β^+	13
CIBERSORTx	$\arg\min_{\beta,\nu,\epsilon} C\sum_m \lvert a^*_m - \mathbf{s}_m \cdot \beta\rvert_\epsilon + \frac{1}{2}\lvert\lvert\beta\rvert\rvert^2 + \nu\epsilon$	Reference	`svm`	DE'ed, prioritized by fold change, not expressed in non-hematopoietic cells	β^+	29
EPIC	$\arg\min_{\substack{\beta \\ \text{s.t. } \beta_m \geq 0\,\forall m \\ \sum_m \beta_m \leq 1}} \sum_m w_m^{\text{EPIC}}(a_m - \mathbf{s}_m \cdot \beta)^2$	Referene	`constrOptim`	DE'ed, not expressed in non-hematopoietic tissues, similarly expressed in healthy and malignant tissues	β	14
MCP-Counter		Enrichment		DE'ed across hierarchy of purified expression profiles, specific to cell type	$\frac{1}{\lvert M_c\rvert}\sum_{m\in M_c} a_m$	15
quanTIseq	$\arg\min_{\substack{\beta \\ \text{s.t. } \beta_m \geq 0\,\forall m \\ \sum_m \beta_m \leq 1}} \sum_m (a_m - \mathbf{s_m} \cdot \beta)^2$	Reference	`lsei`	Correlated with random fractions in simulated admixtures, specific to cell type, expressed in tumors, not expressed in non-hematopoietic tissues, not very highly expressed	β	17
xCell		Enrichment		DE'ed, specific to cell type, not expressed in carcinomas	ssGSEA mapped to linear scale	18
Aginome-XMU	DNN trained to predict random fractions in simulated admixtures	Other		None	Fractions predicted by DNN	30
Biogem	$\arg\min_\beta \sum_m \left[w_H(a_m - \mathbf{s}_m \cdot \beta)\right]^2 (a_m - \mathbf{s}_m \cdot \beta)^2$	Reference	rlm		β	33
DA_505	$\arg\min_{\mathbf{b}_c}(\lvert\lvert\tilde{\mathbf{p}}_c - \tilde{\mathbf{A}}_{M_c} \cdot \mathbf{b}_c\rvert\rvert^2) + \lambda_2\lvert\lvert\mathbf{b}_c\rvert\rvert^2 + \lambda_1\lvert\lvert\mathbf{b}_c\rvert\rvert_1)$	Other		Identified by RF regression against random fractions in simulated admixtures	$\mathbf{A}_{M_c} \cdot \mathbf{b}_c$	
mitten_TDC19		Enrichment		Correlated with random fractions in simulated admixtures	$\sum_{m\in M_c} a_m$	

M_c: set of markers for cell type c
$\mathbf{A}_{M_c}, \tilde{\mathbf{A}}_{M_c}$: input or simulated admixture matrices, respectively, subset to markers for cell type c
$\mathbf{a}, \mathbf{a}^*$: input or batch-corrected admixture expression vector, respectively
a_m: expression for marker m in admixture $\mathbf{a}$

$\mathbf{S}$: marker × cell type signature matrix
$\mathbf{s}_m$: expression vector for marker m across cell types (i.e., column of $\mathbf{S}$)
$\beta^+ \equiv \left(\beta_0^+, \beta_1^+, \dots\right)$ with $\beta_i^+ \equiv \max(\beta_i, 0)$

$\lvert e\rvert_\epsilon \equiv 0$ if $\lvert e\rvert < \epsilon$; $\lvert e\rvert - \epsilon$ otherwise

$w_H(e) \equiv 1$if $\lvert e\rvert < k$; $k/\lvert e\rvert$otherwise
w_m^{EPIC}: weight giving marker m importance relative to its variability
$\tilde{\mathbf{p}}_c$: vector of proportions of cell type c in simulated admixtures