Supplemental material

One-step estimator paths for concave regularization

7 Implementation via coordinate descent

We use Coordinate descent (CD; e.g., Luenberger and Ye, 2008) to minimize (3) at each step along the path. CD is a local optimization algorithm that cycles through minimization of the conditional objective for individual parameters when the remaining parameters are fixed. Algorithms of this type have have become popular in L_1 penalized estimation since the work by Friedman et al. (2007) and Wu and Lange (2008).

Our CD routine, outlined in Algorithm 1, is a solver for penalized weighted-least squares problems as defined in equation (21) below. This applies directly in Gaussian regression, and for non-Gaussian models we follow Friedman et al. (2010) and apply CD inside an outer loop of iteratively re-weighted-least-squares (IRLS; e.g., Green, 1984). Given current parameter values $\hat{\boldsymbol{\beta}}$, the Newton-Raphson update for maximum likelihood estimation is $\boldsymbol{\beta} = \hat{\boldsymbol{\beta}} - \mathbf{H}^{-1}\mathbf{g}$, where $\mathbf{H}$ is the information matrix with elements $h_{jk} = \partial^2 l/\partial\beta_j\partial\beta_k|_{\hat{\boldsymbol{\beta}}}$ and $\mathbf{g}$ is coefficient gradient (see Appendix 8). For exponential family linear models we can write $\mathbf{H} = \mathbf{X}'\mathbf{V}\mathbf{X}$ and $\mathbf{g} = \mathbf{X}'\mathbf{V}(\mathbf{z} - \hat{\boldsymbol{\eta}})$, where $\mathbf{V} = \mathrm{diag}(\mathbf{v})$, $\mathbf{v} = [v_1 \dots v_n]$ are 'weights', $\mathbf{z} = [z_1 \dots z_n]$ are transformed 'response', and $\hat{\eta}_i = \hat{\alpha} + \mathbf{x}_i\hat{\boldsymbol{\beta}}$. In Gaussian regression, $v_i = 1$, $z_i = \hat{\eta}_i - y_i$, and the update is an exact solution. For binomial regression, $v_i = q_i(1-q_i)$ and $z_i = \hat{\eta}_i - (y_i - q_i)/v_i$, where $q_i = (1+\exp[-\hat{\eta}_i])^{-1}$ is the estimated probability of success.

This yields $\boldsymbol{\beta} = (\mathbf{X}'\mathbf{V}\mathbf{X})^{-1}\mathbf{X}'\mathbf{V}\mathbf{z}$, such that the Newton update solves a weighted-least-squares problem. Adding L_1 costs, the minimization objective from (3) becomes

$$\underset{\alpha,\beta_1\dots\beta_p\in\mathbb{R}}{\mathrm{argmin}} \sum_i \frac{v_i}{2}(\alpha + \mathbf{x}_i'\boldsymbol{\beta} - z_i)^2 + n\sum_j \omega_j\lambda|\beta_j|. \tag{21}$$

Our solver iterates between CD on (21) and, for non-Gaussian models, updates to $\mathbf{v}$ and $\mathbf{z}$. Each t^{th} segment IRLS routine initializes $[\hat{\alpha}, \hat{\boldsymbol{\beta}}]$ at solutions for λ^{t-1}, or at $[\hat{\alpha}, \mathbf{0}]$ for $t = 1$. In the `gamlr` implementation, a full pass update of all parameters is done only at the first CD iteration; otherwise coordinates with currently inactive (zero) $\hat{\beta}_j$ are not updated. Once the descent converges for this *active set*, IRLS $\mathbf{v}$ and $\mathbf{z}$ are updated and we begin a new CD loop with a full pass update. The routine stops when maximum squared change in β_j scaled by its information over one of these full pass updates is less than some tolerance threshold, `thresh`. The default in `gamlr` uses a relative tolerance of 10^{-7} times null model deviance.

Algorithm 1 Coordinate descent

Set $\texttt{vh}_\texttt{j} = \sum_i v_i(x_{ij} - \bar{x}_j)^2$ and $\texttt{vx}_\texttt{j} = \sum_i v_i x_{ij}$ for $j = 1 \ldots p$.

while $\max_{j=1\ldots p} \texttt{vh}_\texttt{j}\Delta_j^2 > \texttt{thresh}$:

  for j=1…p:

    set $\texttt{vg}_\texttt{j} = -\sum_i x_{ij} v_i (z_i - \hat{\eta}_i)$ and $\texttt{ghb} = \texttt{vg}_\texttt{j} - \texttt{vh}_\texttt{j}\hat{\beta}_j$

    if $|\texttt{ghb}| < n\lambda^t\omega_j^t$: $\Delta_j = -\hat{\beta}_j$

    else: $\Delta_j = -(\texttt{vg}_\texttt{j} - \text{sign}(\texttt{ghb})n\lambda^t\omega_j^t)/\texttt{vh}_\texttt{j}$.

    update $\hat{\beta}_j \stackrel{\pm}{=} \Delta_j$, $\hat{\alpha} \stackrel{\pm}{=} -\texttt{vx}_\texttt{j}\Delta_j$, and $\hat{\boldsymbol{\eta}} = \hat{\alpha} + \mathbf{X}'\hat{\boldsymbol{\beta}}$.

7.1 Descent convergence

Despite the non-differentiability of $|\beta_j|$ at zero, Tseng (2001) establishes local convergence for CD on (21) as a consequence of penalty separability: the non-differentiable part of our objective is a sum of functions on only a single coordinate. Thus CD solves each weighted-least squares problem, and the full algorithm converges if IRLS does. For non-Gaussian models, convergence of such nested L_1-penalized IRLS algorithms is shown in Lee et al. (2014).

7.2 Quasi-Newton acceleration

Under high collinearity and large γ, one may wish to accelerate convergence via a quasi-Newton step (e.g., Lange, 2010). Acceleration is applied to $\boldsymbol{\theta} = [\alpha, \boldsymbol{\beta}]$, and a move is accepted only if it leads to a decrease in the objective. Suppose that $\hat{\boldsymbol{\theta}}^{(0)}$, $\hat{\boldsymbol{\theta}}^{(-1)}$, and $\hat{\boldsymbol{\theta}}^{(-2)}$ are the current, previous, and previous-to-previous parameter estimates. Write $M(\hat{\boldsymbol{\theta}}^{(t)})$ as the implied CD update map $\hat{\boldsymbol{\theta}}^{(t)} \to \hat{\boldsymbol{\theta}}^{(t+1)}$, such that the algorithm converges at $\hat{\boldsymbol{\theta}} - M(\hat{\boldsymbol{\theta}}) = \mathbf{0}$. With $\mathbf{u} = \hat{\boldsymbol{\theta}}^{(-1)} - \hat{\boldsymbol{\theta}}^{(-2)}$ and $\mathbf{v} = \hat{\boldsymbol{\theta}}^{(0)} - \hat{\boldsymbol{\theta}}^{(-1)}$, a secant approximation to the gradient of M is $\partial M/\partial\hat{\theta}_l \approx \mathrm{v}_l/\mathrm{u}_l$. An approximate Newton-Raphson step to solve for the root of $\hat{\boldsymbol{\theta}} - M(\hat{\boldsymbol{\theta}})$ updates each coordinate $\hat{\theta}_l \leftarrow \hat{\theta}_l^{(-1)} - (\hat{\theta}_l^{(-1)} - \hat{\theta}_l^{(0)})/(1 - \mathrm{v}_l/\mathrm{u}_l)$ which can be re-written as $\hat{\theta}_l = (1 - \mathrm{w}_l)\hat{\theta}_l^{(-1)} + \mathrm{w}_l\hat{\theta}_l^{(0)}$ where $\mathrm{w}_l = \mathrm{u}_l/(\mathrm{u}_l - \mathrm{v}_l)$.

8 Gradient, curvature, and path starts

The negative log likelihood objective in Gaussian regression is $l(\alpha, \boldsymbol{\beta}) = 0.5 \sum_i (y_i - \eta_i)^2$ with gradient $g_j(\boldsymbol{\beta}) = \partial l / \partial \beta_j = -\sum_i x_{ij}(y_i - \eta_i)$, and coordinate curvature $h_j(\boldsymbol{\beta}) = \partial^2 l / \partial \beta_j^2 = \sum_i x_{ij}^2$. In logistic regression, set $y_i = 1$ for 'success' and $y_i = 0$ for 'failure' and write $q_i = (1+\exp[-\eta_i])^{-1}$ as the probability of success. Then $l(\alpha, \boldsymbol{\beta}) = \sum_i -y_i\eta_i + \log(1+\exp[\eta_i])$, $g_j(\boldsymbol{\beta}) = \partial l/\partial \beta_j = -\sum_i x_{ij}(y_i - q_i)$, and $h_j(\boldsymbol{\beta}) = \partial^2 l/\partial \beta_j^2 = \sum_i x_{ij}^2 q_i(1-q_i)$. In each case, it is implied that $\hat{\alpha}$ has been set to minimize $l(\alpha, \hat{\boldsymbol{\beta}})$.

For L_1 costs $c_j(|\beta_j|) = |\beta_j|$, the infimum λ such that $\hat{\boldsymbol{\beta}} = \mathbf{0}$ is available analytically as $\lambda^1 = n^{-1} \max\{|g_j(\mathbf{0})|,\ j = 1 \dots p\}$, the maximum mean absolute gradient for the null model with $\boldsymbol{\beta} = \mathbf{0}$. This formula is used to obtain our starting values for the path algorithms.

9 False Discovery Control

A common goal in high-dimensional estimation is support recovery – having the set $\{j : \hat{\beta}_j \neq 0\} = \{j : \beta_j \neq 0\}$ for some 'true' $\boldsymbol{\beta}$. For standard lasso estimated $\hat{\boldsymbol{\beta}}$, many authors have shown (e.g., Buhlmann and van de Geer, 2011; Zou, 2006) that to get exact support recovery asymptotically or with high probability requires an *irrepresentability condition* which limits the size of least-squares projections from 'true support' onto spurious covariates.

DEFINITION 9.1. *The $(\theta, S, \mathbf{v})$-irrepresentable condition for $\theta \in [0,1]$ and $\mathbf{v} \in \mathbb{R}^s$ holds that,*

$$|\boldsymbol{x}_j' \mathbf{X}_S (\mathbf{X}_S' \mathbf{X}_S)^{-1} \mathbf{v}| \leq \theta \ \ \forall\, j \notin S \tag{22}$$

This is often presented with $\mathbf{v} = \mathbf{1}$.[1] It can be a strict design restriction; for example, Buhlmann and van de Geer (2011) show a single variable that is highly correlated with many columns of $\mathbf{X}_S$ leading to failure. Much of the literature on concave penalization has focused on achieving support recovery *without* such conditions; see, e.g., Fan et al. (2014) for a recent overview. Our results will require irrepresentable conditions with $\mathbf{v} = \boldsymbol{\omega}_S$, which becomes less restrictive as one is able to shrink weights ω_j for $j \in S$. See the remarks for more discussion.

Our comparison of interest is between $\hat{S} = \{j : \hat{\beta}_j \neq 0\}$, for $\hat{\boldsymbol{\beta}}$ from weighted-L_1 penalized estimation, and $S = \{j : \beta_j^\nu \neq 0\}$ for $\boldsymbol{\beta}^\nu$ the L_0 penalized estimator from Theorem 3.1. Whether looking to an L_0 oracle or a sparse truth, our experience is that exact support recovery does not occur in practice (e.g., see the simulation in Section 5). Thus, we instead focus on ability of the weighted-lasso to minimize *false discoveries*: $\hat{\beta}_j \neq 0$ when $\beta_j^\nu = 0$.

[1] Wainwright (2009) shows that (22) with $\theta = 1$, $\mathbf{v} = \mathbf{1}$ is necessary for lasso sign recovery in the *noiseless* setting.

THEOREM 9.1. *Consider the setting of Theorem 3.1. If* $\omega_{S^c}^{\min} = 1$ *and* $\lambda > \sqrt{2\nu}$ *then*

$$\|\mathbf{X}_{S^c}'\mathbf{X}_S(\mathbf{X}_S'\mathbf{X}_S)^{-1}\boldsymbol{\omega}_S\|_\infty \leq 1 - \frac{\sqrt{2\nu}}{\lambda_t} \;\; \Rightarrow \;\; \hat{S} \cap S^c = \varnothing. \tag{23}$$

The result follows directly from the sign recovery lemma 9.1.

Remarks

- From Theorem 7.4 in Buhlmann and van de Geer (2011), the irrepresentability condition holds with $|\boldsymbol{x}_j'\mathbf{X}_S(\mathbf{X}_S'\mathbf{X}_S)^{-1}\boldsymbol{\omega}_S| \leq \frac{\|\boldsymbol{\omega}_S\|}{\sqrt{s}}\theta_{\mathrm{adap}}(S)$ where $\theta_{\mathrm{adap}}(S)$ is their 'adaptive restricted regression' coefficient. Of interest here, they show that $\theta_{\mathrm{adap}}(S) \leq \sqrt{s}/\Lambda_{\min}(S)$ where $\Lambda_{\min}(S)$ is the minimum eigenvalue of $\mathbf{X}_S'\mathbf{X}_S/n$. Thus, (i) can be replaced by the restriction $\Lambda_{\min}(S) \geq \|\boldsymbol{\omega}_S\|(1 - \sqrt{2\nu}/(\omega_{S^c}^{\min}\lambda))^{-1} = \sqrt{s}L$, with L from Theorem 3.1, and small values for L appear key in both predictive performance and support recovery.

- Without irrepresentability, limits on false discovery are more pessimistic. Convergence conditions imply that for $j \in S^c \cap \hat{S}$ we have $n\lambda\omega_j = |\boldsymbol{x}_j'(\mathbf{X}\hat{\boldsymbol{\beta}} - \mathbf{y})| \leq |\boldsymbol{x}_j'\mathbf{X}(\hat{\boldsymbol{\beta}} - \boldsymbol{\beta}^\nu)| + |\boldsymbol{x}_j'\mathbf{e}^S| \leq n\left(2\|\boldsymbol{\omega}_S\|/\phi(L,S) + \sqrt{2\nu}/\lambda\right)\ \forall\, j$. Dividing by $n\lambda\omega_j$ and counting yields

$$|S^c \cap \hat{S}| \leq \left|\frac{1}{\boldsymbol{\omega}_{S^c \cap \hat{S}}}\right| \left(\frac{2\|\omega_S\|}{\phi(L,S)} + \frac{\sqrt{2\nu}}{\lambda}\right) \tag{24}$$

Without the ability to make ω_j very big for $j \in S^c$ (e.g., as in a thresholding procedure like that of Zhou 2009), the result in (24) has little to say about false discovery control.

9.1 Sign Recovery

LEMMA 9.1. *Under the setting of Theorem 3.1, with* $\hat{S} = \{j : \hat{\beta}_j \neq 0\}$, *if* $\omega_{S^c}^{\min}\lambda > \sqrt{2\nu}$ *then*

$$|\boldsymbol{x}_j'\mathbf{X}_S(\mathbf{X}_S'\mathbf{X}_S)^{-1}\boldsymbol{\omega}_S| \leq 1 - \frac{\sqrt{2\nu}}{\lambda\omega_j} \;\; \forall\, j \;\in\; S^c \Rightarrow \hat{S} \cap S^c = \varnothing. \tag{25}$$

If in addition $|(\mathbf{X}_S'\mathbf{X}_S)^{-1}\mathbf{X}_S'\mathbf{y}|_\infty > n\lambda\,|(\mathbf{X}_S'\mathbf{X}_S)^{-1}\boldsymbol{\omega}_S|_\infty$, *then* $\mathrm{sgn}(\hat{\boldsymbol{\beta}}) = \mathrm{sgn}(\boldsymbol{\beta}^\nu)$.

Proof. The Karush-Kuhn-Tucker (KKT) conditions at weighted-L_1 minimization convergence imply that

$$\mathbf{x}_j'\mathbf{X}(\hat{\boldsymbol{\beta}} - \boldsymbol{\beta}^\nu) + \mathbf{x}_j'\mathbf{e}^S = -n\lambda\zeta_j \;\text{ for }\; j = 1\ldots p \tag{26}$$

where $|\zeta_j| = \omega_j$ for $j \in \hat{S}$ and $|\zeta_j| \leq \omega_j$ for $j \in \hat{S}^c$. Following closely related proofs in Wainwright (2006, 2009); Zhou et al. (2009), $\hat{S} \cap S^c = \varnothing$ occurs if and only if these KKT conditions hold for projections restricted to S,

$$\mathbf{X}_S'\mathbf{X}_S(\hat{\boldsymbol{\beta}}_S - \boldsymbol{\beta}_S^\nu) + \mathbf{X}_S'\mathbf{e}^S = -n\lambda\boldsymbol{\zeta}_S \;\;\Rightarrow\;\; \hat{\boldsymbol{\beta}}_S - \boldsymbol{\beta}_S^\nu = -n\lambda(\mathbf{X}_S'\mathbf{X}_S)^{-1}\boldsymbol{\zeta}_S. \tag{27}$$

Thus all of the spurious regressors in S^c will have $\hat{\beta}_j = 0$ if and only if

$$\boldsymbol{x}_j'\mathbf{X}_S(\hat{\boldsymbol{\beta}}_S - \boldsymbol{\beta}_S^\nu) - \boldsymbol{x}_j'\mathbf{e}^S \le n\lambda\zeta_j \;\;\Leftarrow\;\; 1 - \frac{|x_j'\mathbf{e}^S|}{n} \ge 1 - \frac{\sqrt{2\nu}}{\lambda\omega_j} \ge |\boldsymbol{x}_j'\mathbf{X}_S(\mathbf{X}_S'\mathbf{X}_S)^{-1}\boldsymbol{\omega}_S|. \tag{28}$$

Finally, for sign recovery on $j \in S$ we need $|\beta_j^\nu| - |\beta_j^\nu - \hat{\beta}_j| > 0 \;\; \forall \; j \;\in\; S$, and our stated condition follows from $\boldsymbol{\beta^\nu}_S = (\mathbf{X}_S'\mathbf{X}_S)^{-1}\mathbf{X}_S'\mathbf{y}$ and $\boldsymbol{\beta^\nu}_S - \hat{\boldsymbol{\beta}}_S = n\lambda(\mathbf{X}_S'\mathbf{X}_S)^{-1}\boldsymbol{\zeta}_S$. □

10 Extra proofs

10.1 Stagewise Regression

Theorem 3.1 uses the following simple result for stagewise regression – iterative fitting of new covariates to the residuals of an existing linear model (as in, e.g., Goldberger 1961).

LEMMA 10.1. *Say* $\mathrm{MSE}_S = \|\mathbf{X}\boldsymbol{\beta}^S - \mathbf{y}\|^2/n$ *and* $\mathrm{cov}(\boldsymbol{x}_j, \mathbf{e}^S) = \boldsymbol{x}_j'(\mathbf{y} - \mathbf{X}\boldsymbol{\beta}^S)/n$ *are sample variance and covariances. Then for any* $j \in 1 \ldots p$,

$$\mathrm{cov}^2(\boldsymbol{x}_j, \mathbf{e}^S) \le \mathrm{MSE}_S - \mathrm{MSE}_{S\cup j}$$

Proof. From the well-known property on the correlation coefficient (R^2) for linear models, in-sample correlation and variances are such that

$$\frac{\mathrm{cov}^2(\boldsymbol{x}_j, \mathbf{e}^S)}{\mathrm{var}(\boldsymbol{x}_j)\mathrm{var}(\mathbf{e}^S)} = 1 - \frac{\mathrm{var}(\mathbf{e}^S - \tilde{\beta}_j\boldsymbol{x}_j)}{\mathrm{var}(\mathbf{e}^S)}$$

where $\tilde{\beta}_j = \boldsymbol{x}_j'\mathbf{e}^S/(\boldsymbol{x}_j'\boldsymbol{x}_j)$ is the stagewise coefficient estimate. Since $\mathrm{var}(\boldsymbol{x}_j) = 1$, multiplying everything by $\mathrm{var}(\mathbf{e}^S)$ yields $\mathrm{cov}^2(\boldsymbol{x}_j, \mathbf{e}^S) = \mathrm{var}(\mathbf{e}^S) - \mathrm{var}(\mathbf{e}^S - \tilde{\beta}_j\boldsymbol{x}_j) \le \mathrm{var}(\mathbf{e}^S) - \mathrm{var}(\mathbf{e}^{S\cup j})$. The last inequality holds because $\mathbf{e}^{S\cup j}$, residuals from OLS on $\mathbf{X}_{S\cup j}$, have the smallest-possible sum of squares for that set of covariates. With $\mathrm{var}(\mathbf{e}^S) = \mathrm{MSE}_S$, etc, we are done. □

10.2 Bayesian MAP

PROPOSITION 10.1. $\hat{\boldsymbol{\beta}}$ *solves (14) if and only if it is also in the solution to (13).*

Proof. The conditional posterior mode for each τ_j given β_j is $\tau(\beta_j) = \gamma s/(1 + \gamma|\beta_j|)$. Any joint solution $[\hat{\boldsymbol{\beta}}, \hat{\boldsymbol{\tau}}]$ for (13) thus consists of $\hat{\tau}_j = \tau(\hat{\beta}_j)$; otherwise, it is always possible to decrease the objective by replacing $\hat{\tau}_j$. Setting each $\tau_j = \tau(\beta_j)$ in (13) and removing constant terms yields (14). Moreover, the solution to (13) solves (14): otherwise, there would need to be a point on the profile slice of (13) defined by $\tau_j = \tau(\hat{\beta}_j)$ that is lower than its minimum. $\square$

For a Bayesian it is odd to be solving for $\boldsymbol{\tau}$ rather than marginalizing over its uncertainty. However, recognizing the form of a gamma density in (12), $\pi(\beta_j, \tau_j)$ integrates over τ_j to yield the marginal prior $\pi(\beta_j) = 0.5s\,(1 + \gamma|\beta_j|)^{-(s+1)}$. This is the generalized double Pareto density, as in Armagan et al. (2013). Since $-\log \pi(\beta_j) \propto (s + 1)\log(1 + \gamma|\beta_j|)$, the *profile* MAP solution to (13) is also the *marginal* MAP for $\boldsymbol{\beta}$ under $\mathrm{Ga}(s - 1, 1/\gamma)$ priors on each τ_j.

11 Stability

A strong form of stability comes from convexity of the penalized objective in (1). This requires that the minimum eigenvalue of $\mathbf{H}(\boldsymbol{\beta})$, the Hessian matrix of second derivatives of $l(\boldsymbol{\beta})$, is greater than $|c''(\beta_j)|\ \forall j$. For penalized least-squares under log costs, this amounts to requiring that the minimum eigenvalue of $\mathbf{H} = \mathbf{X}'\mathbf{X}$ is greater than $\lambda\gamma^2$.[2] In the simple *standardized orthogonal covariate* case, this has an easy interpretation in the context of our Bayesian model from Section 4.1: for Gaussian regression, $h_j = \sum_i x_{ij}^2 = n$ and the objective is convex if prior variance on each τ_j is less than the number of observations. For logistic regression you need $\mathrm{var}(\tau_j) < n/4$, since $\mathbf{H}$ now depends upon the coefficient values.

In real examples, however, we cannot rely upon objective convexity. A more useful definition of stability requires continuity of the implied coefficient function, $\hat{\beta}(\mathbf{y})$, in an imagined univariate regression problem (or for orthogonal covariates). This is one of the key requirements of concave penalties listed by Fan and Li (2001). Many popular concave cost functions, such as the SCAD and MCP, have been engineered to have this continuity property. Conveniently, Zou and Li (2008) show that OSE LLA solutions have this property even if the target objective does not. For example, even though the log penalty *does not* generally lead to continuous thresholding, their result implies that the GL solutions are continuous for $\gamma < \infty$.

A theoretically richer form of stability is Lipschitz continuity of the implied prediction function, $\hat{\boldsymbol{y}} = \mathbf{X}\hat{\boldsymbol{\beta}}(\mathbf{y})$, which requires that $\|\hat{\mathbf{y}}(\mathbf{y}_1) - \hat{\mathbf{y}}(\mathbf{y}_2)| \leq L\|\mathbf{y}_1 - \mathbf{y}_2\|$ for some finite constant L on all possible $\mathbf{y}_1, \mathbf{y}_2$. Zou et al. (2007) establish Lipschitz continuity for L_1 estimated

[2] If ν is an eigenvalue of $\mathbf{H}$, then $(\mathbf{H} - \nu\mathbf{I})\mathbf{v} = 0$ for some nonzero $\mathbf{v}$; the negative log posterior Hessian at zero is $\mathbf{H} - \lambda\gamma^2\mathbf{I}$ and $(\mathbf{H} - \lambda\gamma^2\mathbf{I} + s\gamma^2\mathbf{I} - \nu\mathbf{I})\mathbf{v} = 0$ so that $\nu - s\gamma^2$ is an eigenvalue of the minimization objective.

predictors as part of their derivation of a degrees-of-freedom estimator. Thus, conditional upon values for the coefficient-specific weights, POSE and GL are trivially Lipschitz continuous. Unconditionally, we do not believe that the paths have this guarantee. However, we'll see in the next section that a heuristic degrees-of-freedom estimator that takes such stability for granted performs well as the basis for model selection.

Finally, the basic and most important type of stability is practical path continuity: by this, we mean that solutions change slowly enough along the path so that computational costs are kept within budget. A regularization path can be built from a continuous thresholding function, or perhaps even be Lipschitz stable, but none of that matters if it takes too long to fit. For example, Figure 4 shows timings growing rapidly with large γ for the hockey data of Section 6, even though all of these specifications are theoretically stable by some criteria.

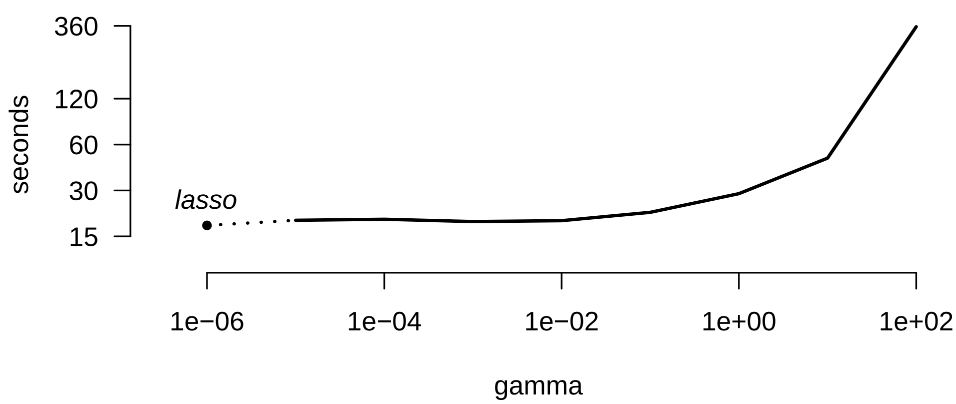

Figure 4: Timings for the hockey data path fits of Section 6 on a length-100 grid with $\lambda^{100} = 0.01\lambda^1$.

12 Information Criteria

We would like to choose a model that performs well in predicting new data. 'Good prediction' can be measured in a variety of ways. A common and coherent framework is to consider minimizing Kullback-Leibler (KL) divergence. Say $g(\mathbf{y})$ is the true data generating process, and $f(\mathbf{y}; \boldsymbol{\eta}, \phi)$ is the parametric density under study, which we suppose here is a natural exponential family with $\mathbb{E}[\mathbf{y}] = \boldsymbol{\eta}$ and dispersion ϕ. Then we wish to minimize

$$\mathrm{KL}(\boldsymbol{\eta}, \phi) = \mathbb{E}_g \log g(\mathbf{y}) - \mathbb{E}_g \log f(\mathbf{y}; \boldsymbol{\eta}, \phi), \tag{29}$$

the expected difference between log true density and our parametric approximation. Since $\mathbb{E}_g \log g(\mathbf{y})$ is constant, this leads one to minimize $Q(\boldsymbol{\eta}, \phi) = -\mathbb{E}_g \log f(\mathbf{y}; \boldsymbol{\eta}, \phi)$, the expected negative log likelihood. There is no requirement that g is a member of the family defined by f.

If parameters are to be estimated as $[\boldsymbol{\eta}_{\mathbf{y}}, \phi_{\mathbf{y}}]$, functions of random sample $\mathbf{y} \sim g$, then $Q(\boldsymbol{\eta}_{\mathbf{y}}, \phi_{\mathbf{y}})$ is itself a random variable and one chooses estimators to minimize its expectation. *Crucially, we imagine a double-sample expectation*, where the minimization objective is

$$\mathbb{E}_{\mathbf{y}|g}\mathbb{E}_{\tilde{\mathbf{y}}|g} \log f(\tilde{\mathbf{y}}; \boldsymbol{\eta}_{\mathbf{y}}, \phi_{\mathbf{y}}). \tag{30}$$

The notation here indicates that inner and outer expectations are based on two *independent* random samples from g: $\mathbf{y}$ for training, upon which $\boldsymbol{\eta}_{\mathbf{y}}, \phi_{\mathbf{y}}$ are calculated, and $\tilde{\mathbf{y}}$ for validation.

Information criteria (IC) are analytic approximations to metrics like (30).[3] They take the form

$$-2 \log f(\mathbf{y}; \boldsymbol{\eta}_{\mathbf{y}}, \phi_{\mathbf{y}}) + c(df) \tag{31}$$

where $c(df)$ is cost of the *degrees-of-freedom* used in $\boldsymbol{\eta}_{\mathbf{y}}$ – e.g., for $\mathbf{y} \sim (\boldsymbol{\eta}, \sigma^2\mathbf{I})$, Efron et al. (2004) defines $df = \sigma^{-2} \sum_i \mathrm{cov}(\eta_{\mathbf{y}i}, y_i)$.

Consider a Gaussian regression model where $\boldsymbol{\eta}_{\mathbf{y}}$ is an estimate for $\boldsymbol{\eta} = \mathbb{E}\mathbf{y}$ using df degrees of freedom, and set $\phi_{\mathbf{y}} = \sigma_{\mathbf{y}}^2 = \sum_i (y_i - \eta_{\mathbf{y}i})^2/n$. We'll derive

$$df \frac{n}{n - df - 1} \approx \mathbb{E}_{\mathbf{y}|g}\left[\log f(\mathbf{y}; \boldsymbol{\eta}_{\mathbf{y}}, \phi_{\mathbf{y}}) - \mathbb{E}_{\tilde{\mathbf{y}}|g} \log f(\tilde{\mathbf{y}}; \boldsymbol{\eta}_{\mathbf{y}}, \phi_{\mathbf{y}})\right], \tag{32}$$

such that AICc's complexity penalty is the expected bias that results from taking the fitted log likelihood as an estimate for (30). First, by cancellation the inner term of (32) simplifies as

$$\log f(\mathbf{y}; \boldsymbol{\eta}_{\mathbf{y}}, \phi_{\mathbf{y}}) - \mathbb{E}_{\tilde{\mathbf{y}}|g} \log f(\tilde{\mathbf{y}}; \boldsymbol{\eta}_{\mathbf{y}}, \phi_{\mathbf{y}}) = \frac{\mathbb{E}_{\tilde{\mathbf{y}}|g} \sum_i (\tilde{y}_i - \eta_{\mathbf{y}i})^2}{2\sigma_{\mathbf{y}}^2} - \frac{n}{2}. \tag{33}$$

Now, assume that the *true* model is linear and that the data were generated from $\mathbf{y} \sim g(\boldsymbol{\eta}, \sigma^2\mathbf{I})$. The Mallows (1973) C_p formula holds that $n\sigma_{\mathbf{y}}^2 + 2\sigma^2 df$ is an unbiased estimator for expected sum of square errors $\mathbb{E}_{\tilde{\mathbf{y}}|g} \sum_i (\tilde{y}_i - \eta_{\mathbf{y}i})^2/n$, such that

$$\frac{\mathbb{E}_{\tilde{\mathbf{y}}|g} \sum_i (\tilde{y}_i - \eta_{\mathbf{y}i})^2}{2\sigma_{\mathbf{y}}^2} - \frac{n}{2} \approx \frac{n\sigma_{\mathbf{y}}^2 + 2\sigma^2 df}{2\sigma_{\mathbf{y}}^2} - \frac{n}{2} = df \frac{\sigma^2}{\sigma_{\mathbf{y}}^2}. \tag{34}$$

At this point, we see that the standard AIC approximation results from equating $\sigma^2 \approx \mathbb{E}_{\mathbf{y}|g}\sigma_{\mathbf{y}}^2$, so that $df\,\mathbb{E}_{\mathbf{y}|g}[\sigma^2/\sigma_{\mathbf{y}}^2] \approx df$. This will underpenalize complexity whenever residual variance

[3]Not all IC target (30). For example, the 'Bayesian' BIC, with $c(df) = \log(n)df$ (Schwarz, 1978), is derived (Kass and Raftery, 1995) as Laplace approximation to the negative log of the *marginal likelihood*. We include the BIC as a comparator to AIC and AICc in our examples.

$\sigma^2_{\mathbf{y}}$ tends to be smaller than the true variance σ^2 – that is, whenever the model is overfit. In contrast, AICc applies the chi-squared goodness of fit result $n\sigma^2_{\mathbf{y}}/\sigma^2 \sim \chi^2_{n-df-1}$ to obtain

$$\mathbb{E}_{\mathbf{y}|g}\left[\frac{\sigma^2}{\sigma^2_{\mathbf{y}}}df\right] = n\mathbb{E}_{\mathbf{y}|g}\left[\frac{1}{n\sigma^2_{\mathbf{y}}/\sigma^2}\right]df = \frac{n}{n-df-1}df. \tag{35}$$

Multiplying by -2 and subtracting from $-2\log f(\mathbf{y};\boldsymbol{\eta}_{\mathbf{y}},\sigma_{\mathbf{y}})$ yields the AICc.

13 Full simulation results

Continuous-response data are simulated from a $p = 1000$ dimensional linear model

$$y \sim \mathrm{N}\left(\mathbf{x}'\boldsymbol{\beta},\sigma^2\right) \;\text{ where }\; \beta_j = (-1)^j \exp\left(-\frac{j}{\mathsf{d}}\right) \text{ for } \; j = 1\ldots p \;\text{ and, given } \mathbf{z} \sim \mathrm{N}\left(\mathbf{0},\boldsymbol{\Sigma}\right),$$
$$\text{either } \textit{dense design: } x_j = z_j \;\text{ or }\; \textit{sparse design: } x_j \overset{ind}{\sim} \mathrm{Bern}\left(1/(1+e^{-z_j})\right). \tag{36}$$

Each simulation draws $n = 1000$ means $\eta_i = \mathbf{x}_i'\boldsymbol{\beta}$, and two independent response samples $\mathbf{y}, \tilde{\mathbf{y}} \sim \mathrm{N}(\boldsymbol{\eta},\sigma^2\mathbf{I})$. Residual variance σ^2 and covariate correlation $\boldsymbol{\Sigma}$ are adjusted across runs. In the first case, we define σ^2 through *signal-to-noise* ratios $\mathrm{sd}(\boldsymbol{\eta})/\sigma$ of $1/2$, 1, and 2. In the latter case, multicollinearity is parametrized via $\Sigma_{jk} = \rho^{|j-k|}$, and we consider $\rho = 0, 0.5,$ and 0.9. Finally, the coefficient decay rate d controls the effective sparsity: how much $\boldsymbol{\beta}$ is *measurably* different from zero. See Figure 5 for illustration; we consider d of 10, 50, 100, and 200.

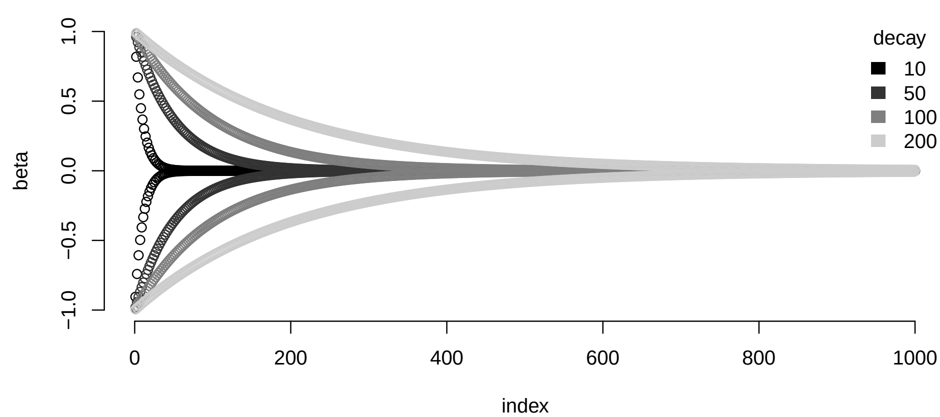

Figure 5: The linear model coefficients for our simulation in 36.

Results for both sparse and dense designs, over a set of 1000 datasets, are presented in the following tables. We first report out-of-sample $R^2 = 1 - \mathrm{var}(\tilde{\mathbf{y}} - \boldsymbol{\eta}_{\mathbf{y}})/\mathrm{var}(\tilde{\mathbf{y}})$, followed by tables showing false discovery and sensitivity with respect to the C_p oracle.

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Table 3: **Predictive R^2 for 100 observations, binary design with dense covariates.** Reported as % worse than the Oracle – MLE fit on the C_p optimal covariates – across 1000 samples.

			% Worse than Oracle									
			lasso		GL $\gamma = 1$		GL $\gamma = 10$		marginal AL			
sd($\boldsymbol{\eta}$)/σ	d	ρ	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	MCP	Oracle R^2
		0	35	22	30	26	17	47	19	**14**	25	*0.73*
	10	*0.5*	40	28	34	31	17	51	21	**14**	29	*0.73*
		0.9	43	30	38	34	17	55	23	**15**	32	*0.73*
		0	75	68	13	88	6	96	33	**4**	66	*0.63*
2	*50*	*0.5*	76	71	16	90	6	97	33	**4**	71	*0.63*
		0.9	78	73	21	90	6	96	36	**5**	74	*0.63*
		0	79	73	**-1**	94	0	97	32	**-1**	72	*0.59*
	100	*0.5*	79	75	0	94	0	98	33	**-1**	76	*0.60*
		0.9	80	76	2	94	0	98	35	**-1**	76	*0.60*
		0	80	75	**-3**	96	-1	98	32	**-3**	73	*0.59*
	200	*0.5*	81	79	**-3**	96	-1	98	34	**-3**	78	*0.59*
		0.9	80	79	**-2**	96	-1	98	35	**-2**	78	*0.59*
		0	63	63	64	74	101	90	**41**	79	65	*0.37*
	10	*0.5*	65	66	67	76	99	91	**43**	79	69	*0.37*
		0.9	67	68	69	77	98	90	**45**	78	70	*0.37*
		0	70	72	62	97	108	103	**21**	75	75	*0.20*
1	*50*	*0.5*	72	78	59	98	106	104	**22**	74	81	*0.20*
		0.9	75	79	61	97	106	102	**27**	72	80	*0.20*
		0	57	60	65	102	117	107	**-29**	59	62	*0.12*
	100	*0.5*	63	69	60	102	113	107	**-23**	57	73	*0.12*
		0.9	59	64	58	100	113	106	**-23**	53	65	*0.12*
		0	7	13	50	109	141	117	**-201**	7	15	*0.05*
	200	*0.5*	18	32	45	108	126	116	**-164**	7	42	*0.06*
		0.9	3	16	44	104	130	114	**-184**	-8	24	*0.05*
		0	**115**	142	720	149	1483	152	281	1198	161	*0.04*
	10	*0.5*	**116**	141	633	149	1450	151	287	1186	158	*0.05*
		0.9	**114**	147	623	148	1471	152	295	1171	156	*0.04*
		0	**-74**	-56	969	-53	1162	-49	81	915	-49	*-0.05*
0.5	*50*	*0.5*	**-73**	-56	972	-53	1183	-52	72	920	-47	*-0.05*
		0.9	**-81**	-53	979	-56	1206	-51	82	909	-47	*-0.05*
		0	**-81**	-66	827	-63	929	-61	47	724	-56	*-0.06*
	100	*0.5*	**-80**	-64	824	-60	939	-61	46	730	-57	*-0.06*
		0.9	**-85**	-68	822	-63	945	-62	49	707	-61	*-0.06*
		0	**-80**	-65	843	-62	907	-60	43	706	-57	*-0.06*
	200	*0.5*	**-80**	-65	854	-62	926	-62	42	716	-58	*-0.06*
		0.9	**-86**	-71	822	-66	896	-65	44	670	-61	*-0.06*

Table 4: **Predictive R^2 for 100 observations, continuous design with dense covariates.** Reported as % worse than the Oracle – MLE fit on the C_p optimal covariates – across 1000 samples.

			% Worse than Oracle									
			lasso		GL $\gamma = 1$		GL $\gamma = 10$		marginal AL			
sd($\boldsymbol{\eta}$)/σ	d	ρ	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	MCP	Oracle R^2
		0	35	24	46	28	18	48	19	**13**	26	*0.73*
	10	*0.5*	66	64	81	65	29	73	39	**18**	57	*0.74*
		0.9	40	41	47	41	44	41	23	**18**	40	*0.74*
		0	74	68	61	89	6	96	31	**4**	68	*0.63*
2	*50*	*0.5*	83	85	96	93	**6**	98	43	7	85	*0.64*
		0.9	71	75	90	76	51	83	48	**36**	74	*0.64*
		0	78	72	22	94	0	97	31	**-2**	73	*0.59*
	100	*0.5*	85	86	85	95	**0**	99	40	1	86	*0.59*
		0.9	79	84	97	87	**9**	94	50	35	84	*0.60*
		0	80	75	2	96	-1	98	32	**-3**	76	*0.59*
	200	*0.5*	84	87	53	96	**-1**	99	39	0	86	*0.59*
		0.9	84	88	99	92	**-1**	98	53	36	88	*0.59*
		0	61	64	87	73	100	88	**40**	78	64	*0.37*
	10	*0.5*	76	79	92	82	95	90	**53**	77	78	*0.37*
		0.9	40	42	49	40	42	37	**33**	38	35	*0.39*
		0	70	74	77	96	105	102	**20**	73	74	*0.20*
1	*50*	*0.5*	80	87	97	96	104	104	**32**	67	85	*0.20*
		0.9	68	76	95	78	93	92	40	**36**	75	*0.22*
		0	56	64	63	100	112	107	**-29**	54	66	*0.12*
	100	*0.5*	67	77	79	98	110	107	**-14**	42	78	*0.12*
		0.9	68	79	102	87	99	101	17	**8**	79	*0.13*
		0	9	27	53	104	132	115	**-184**	1	27	*0.05*
	200	*0.5*	31	49	26	104	125	116	**-146**	-33	51	*0.05*
		0.9	42	67	108	87	111	109	-62	**-85**	69	*0.06*
		0	**106**	135	282	137	1311	146	242	1054	141	*0.05*
	10	*0.5*	**114**	127	131	127	1220	139	249	924	137	*0.05*
		0.9	**66**	79	90	77	560	93	125	233	79	*0.08*
		0	**-81**	-56	962	-55	1224	-51	74	956	-41	*-0.05*
0.5	*50*	*0.5*	**-77**	-56	396	-54	1288	-49	86	881	-51	*-0.04*
		0.9	**-68**	-41	-36	-28	2652	0	210	549	-24	*-0.02*
		0	**-83**	-66	857	-62	969	-59	44	745	-57	*-0.06*
	100	*0.5*	**-79**	-62	638	-62	997	-62	50	678	-63	*-0.06*
		0.9	**-71**	-65	-61	-56	1311	-49	57	241	-56	*-0.04*
		0	**-86**	-70	846	-66	907	-62	34	703	-61	*-0.06*
	200	*0.5*	**-80**	-66	775	-65	931	-65	43	624	-66	*-0.06*
		0.9	**-74**	-71	-34	-61	1050	-57	34	173	-65	*-0.05*

Table 5: **Predictive R^2 for 100 observations, binary design with sparse covariates.** Reported as % worse than the Oracle – MLE fit on the true nonzero covariates – across 1000 samples.

			% Worse than Oracle									
			lasso		GL $\gamma = 1$		GL $\gamma = 10$		marginal AL			
$\mathrm{sd}(\boldsymbol{\eta})/\sigma$	d	ρ	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	MCP	Oracle R^2
		0	23	17	17	14	20	20	14	15	**13**	*0.77*
	10	*0.5*	28	19	20	17	20	26	17	16	**15**	*0.77*
		0.9	30	20	22	19	20	29	19	**16**	17	*0.77*
		0	26	18	**14**	17	21	42	16	16	16	*0.77*
2	*50*	*0.5*	34	23	**17**	23	21	53	19	**17**	21	*0.77*
		0.9	37	25	20	27	21	57	22	**17**	23	*0.77*
		0	26	18	**14**	17	21	45	16	16	17	*0.77*
	100	*0.5*	34	24	**16**	24	21	55	19	17	21	*0.77*
		0.9	37	25	19	28	21	59	21	**17**	23	*0.77*
		0	26	19	**13**	17	21	44	16	16	17	*0.77*
	200	*0.5*	34	24	**16**	24	21	55	19	17	21	*0.77*
		0.9	37	25	19	29	21	59	21	**17**	23	*0.77*
		0	59	59	61	67	99	83	**43**	79	62	*0.43*
	10	*0.5*	63	65	66	70	98	86	**47**	81	66	*0.43*
		0.9	65	65	67	71	98	87	**48**	79	67	*0.43*
		0	68	67	68	81	102	94	**48**	83	69	*0.43*
1	*50*	*0.5*	72	73	70	85	101	95	**52**	84	75	*0.43*
		0.9	74	74	71	85	100	96	**54**	82	75	*0.43*
		0	68	67	68	82	102	95	**49**	83	69	*0.43*
	100	*0.5*	72	73	70	85	101	96	**52**	84	76	*0.43*
		0.9	74	74	71	86	101	96	**54**	82	76	*0.43*
		0	68	67	68	82	102	95	**49**	83	69	*0.43*
	200	*0.5*	73	74	70	86	102	96	**52**	84	75	*0.43*
		0.9	75	74	71	86	101	96	**54**	82	76	*0.43*
		0	**106**	117	345	121	734	126	180	598	126	*0.10*
	10	*0.5*	**106**	120	319	120	740	123	182	613	126	*0.10*
		0.9	**106**	118	286	120	714	124	181	579	124	*0.10*
		0	**109**	117	526	122	744	126	182	611	129	*0.10*
0.5	*50*	*0.5*	**108**	121	506	122	748	125	183	616	127	*0.10*
		0.9	**108**	120	489	122	734	124	189	593	127	*0.10*
		0	**109**	118	550	123	752	127	187	616	130	*0.10*
	100	*0.5*	**108**	124	533	122	753	125	185	619	127	*0.10*
		0.9	**107**	121	511	122	740	124	188	597	126	*0.10*
		0	**109**	117	551	122	748	127	184	612	129	*0.10*
	200	*0.5*	**108**	124	542	122	759	125	185	624	129	*0.09*
		0.9	**108**	123	523	124	743	123	189	600	126	*0.10*

Table 6: **Predictive R^2 for 100 observations, continuous design with sparse covariates.** Reported as % worse than the Oracle – MLE fit on the true nonzero covariates – across 1000 samples.

			% Worse than Oracle									
			lasso		GL $\gamma = 1$		GL $\gamma = 10$		marginal AL			
sd($\boldsymbol{\eta}$)/σ	d	ρ	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	MCP	Oracle R^2
2	*10*	*0*	23	17	23	15	21	22	15	15	**14**	*0.78*
		0.5	61	58	74	57	36	65	39	**22**	49	*0.77*
		0.9	45	45	55	45	53	46	29	**22**	42	*0.77*
	50	*0*	26	18	22	17	20	38	16	**15**	16	*0.77*
		0.5	71	70	88	74	23	86	43	**22**	68	*0.77*
		0.9	55	53	72	53	62	56	41	**32**	51	*0.78*
	100	*0*	26	18	21	17	21	41	16	**15**	16	*0.77*
		0.5	72	70	88	75	23	87	43	**22**	69	*0.77*
		0.9	56	53	73	53	61	57	41	**33**	52	*0.77*
	200	*0*	26	18	21	17	21	39	16	**15**	16	*0.77*
		0.5	72	70	89	75	23	87	43	**22**	69	*0.78*
		0.9	56	53	73	53	59	57	41	**33**	52	*0.78*
1	*10*	*0*	58	60	79	66	98	83	**43**	77	62	*0.44*
		0.5	75	78	90	81	94	88	**57**	79	77	*0.44*
		0.9	52	55	64	54	59	52	**45**	49	49	*0.44*
	50	*0*	66	67	87	80	100	93	**47**	80	69	*0.44*
		0.5	83	86	97	91	98	98	**62**	81	86	*0.44*
		0.9	72	75	91	75	88	83	**58**	**58**	72	*0.44*
	100	*0*	67	67	86	81	100	94	**48**	80	68	*0.44*
		0.5	84	86	97	92	99	98	**62**	81	86	*0.44*
		0.9	73	76	93	76	89	84	**59**	**59**	73	*0.44*
	200	*0*	67	67	86	81	101	93	**48**	79	69	*0.44*
		0.5	84	87	97	92	99	98	**62**	81	86	*0.44*
		0.9	73	77	93	77	89	85	**59**	**59**	73	*0.44*
0.5	*10*	*0*	**102**	114	162	117	706	124	167	575	120	*0.10*
		0.5	**105**	115	115	116	692	121	175	531	119	*0.10*
		0.9	**82**	92	99	92	463	102	133	213	92	*0.10*
	50	*0*	**105**	118	321	122	716	125	173	587	123	*0.10*
		0.5	**108**	117	134	119	706	123	178	538	122	*0.10*
		0.9	**103**	111	113	115	662	120	156	241	115	*0.10*
	100	*0*	**105**	117	354	122	718	125	174	589	124	*0.10*
		0.5	**108**	117	141	119	703	123	177	535	122	*0.10*
		0.9	**106**	111	113	115	673	120	158	243	115	*0.10*
	200	*0*	**105**	118	368	122	716	125	174	589	125	*0.10*
		0.5	**108**	117	147	119	705	123	177	534	121	*0.10*
		0.9	**106**	112	113	116	674	121	159	243	115	*0.10*

Table 7: **Predictive R^2 for 1000 observations, binary design with dense covariates.** Reported as % worse than the Oracle – MLE fit on the C_p optimal covariates – across 1000 samples.

$\mathrm{sd}(\boldsymbol{\eta})/\sigma$	d	ρ	lasso *AICc*	lasso *CV*	GL $\gamma=1$ *AICc*	GL $\gamma=1$ *CV*	GL $\gamma=10$ *AICc*	GL $\gamma=10$ *CV*	marginal AL *AICc*	marginal AL *CV*	MCP	Oracle R^2
			% Worse than Oracle									
2	*10*	*0*	3	3	2	2	**1**	**1**	2	2	**1**	*0.79*
		0.5	3	3	2	2	2	**1**	2	2	**1**	*0.79*
		0.9	3	3	2	2	2	2	2	2	**1**	*0.79*
	50	*0*	6	5	5	**4**	5	5	5	5	**4**	*0.77*
		0.5	7	5	5	5	5	5	6	6	**4**	*0.77*
		0.9	7	5	5	5	5	5	6	6	**4**	*0.77*
	100	*0*	9	6	7	**5**	7	7	8	7	**5**	*0.75*
		0.5	10	**6**	8	**6**	7	8	9	8	**6**	*0.75*
		0.9	10	**6**	8	**6**	7	7	9	8	**6**	*0.75*
	200	*0*	15	5	10	6	8	12	11	7	**4**	*0.71*
		0.5	18	**5**	11	6	8	13	13	9	**5**	*0.71*
		0.9	18	**5**	11	6	8	13	14	9	**5**	*0.71*
1	*10*	*0*	8	8	7	7	9	**5**	9	10	**5**	*0.48*
		0.5	9	9	7	7	9	**6**	9	10	**6**	*0.48*
		0.9	10	10	8	8	9	**6**	10	10	**6**	*0.48*
	50	*0*	19	17	**16**	17	31	23	17	18	17	*0.44*
		0.5	21	19	**18**	**18**	30	24	19	20	**18**	*0.44*
		0.9	22	19	**18**	**18**	30	25	20	20	19	*0.44*
	100	*0*	26	**21**	22	25	41	52	22	22	**21**	*0.40*
		0.5	29	**23**	24	27	41	57	25	25	**23**	*0.40*
		0.9	30	**23**	24	27	41	58	26	25	**23**	*0.40*
	200	*0*	35	**21**	25	46	47	94	24	**21**	**21**	*0.34*
		0.5	41	26	27	55	48	96	27	**24**	25	*0.34*
		0.9	41	26	27	54	47	96	28	**25**	26	*0.34*
0.5	*10*	*0*	27	27	**23**	24	52	24	43	55	**23**	*0.17*
		0.5	29	30	25	26	53	26	45	58	**24**	*0.17*
		0.9	30	30	26	26	55	28	46	57	**25**	*0.17*
	50	*0*	**54**	56	60	72	145	94	72	91	57	*0.13*
		0.5	**60**	63	64	77	154	96	78	96	65	*0.13*
		0.9	**61**	65	64	78	146	96	79	96	66	*0.13*
	100	*0*	**62**	69	87	93	150	101	85	113	68	*0.09*
		0.5	**69**	76	89	95	158	101	91	119	77	*0.09*
		0.9	**71**	78	90	96	154	101	93	119	78	*0.09*
	200	*0*	**53**	65	163	101	156	104	100	158	66	*0.04*
		0.5	**65**	75	156	101	162	104	109	169	76	*0.04*
		0.9	**68**	78	155	101	160	104	114	167	80	*0.04*

Table 8: **Predictive R^2 for 1000 observations, continuous design with dense covariates.** Reported as % worse than the Oracle – MLE fit on the C_p optimal covariates – across 1000 samples.

			% Worse than Oracle									
			lasso		GL $\gamma = 1$		GL $\gamma = 10$		marginal AL			
$\mathrm{sd}(\boldsymbol{\eta})/\sigma$	d	ρ	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	MCP	Oracle R^2
2	10	0	3	3	2	2	2	**1**	2	2	**1**	0.79
		0.5	5	5	4	4	3	**2**	8	8	**2**	0.79
		0.9	7	6	6	5	4	4	10	10	**3**	0.79
	50	0	6	5	5	**4**	5	5	5	5	**4**	0.77
		0.5	11	8	9	7	**6**	**6**	14	14	**6**	0.77
		0.9	14	10	11	9	**7**	**7**	44	44	**7**	0.77
	100	0	9	6	7	**5**	7	7	8	7	**5**	0.75
		0.5	18	9	13	**8**	9	9	21	17	9	0.75
		0.9	23	10	16	10	**9**	**9**	56	56	11	0.75
	200	0	16	5	11	6	8	12	11	7	**4**	0.71
		0.5	50	11	24	12	11	75	34	25	**10**	0.71
		0.9	91	42	85	45	**12**	92	68	68	60	0.71
1	10	0	9	9	7	7	8	6	9	10	**5**	0.48
		0.5	16	16	14	13	10	9	18	18	**7**	0.48
		0.9	23	22	20	19	16	14	**10**	**10**	11	0.48
	50	0	19	**17**	**17**	**17**	27	23	**17**	18	**17**	0.44
		0.5	38	32	32	29	28	34	39	38	**25**	0.44
		0.9	70	68	70	53	66	56	46	46	**31**	0.44
	100	0	26	**20**	24	25	45	52	22	22	**20**	0.40
		0.5	64	57	56	61	51	95	51	**47**	57	0.40
		0.9	86	88	90	88	89	88	**65**	67	85	0.40
	200	0	35	**21**	27	47	66	94	23	**21**	**21**	0.34
		0.5	84	87	93	94	84	99	58	**52**	87	0.34
		0.9	91	93	95	93	96	94	**81**	83	93	0.34
0.5	10	0	27	28	27	**24**	48	25	44	57	**24**	0.17
		0.5	49	52	46	44	62	41	71	77	**29**	0.17
		0.9	44	45	44	43	42	42	29	**28**	39	0.18
	50	0	**54**	57	74	71	101	94	72	90	58	0.13
		0.5	**90**	95	98	96	101	100	108	117	95	0.13
		0.9	79	80	81	79	79	77	83	81	**76**	0.13
	100	0	**62**	68	96	93	102	101	84	112	68	0.09
		0.5	**94**	98	101	100	102	101	118	132	98	0.09
		0.9	**87**	89	92	88	95	89	95	92	88	0.09
	200	0	**54**	65	110	100	102	104	98	157	67	0.04
		0.5	**92**	98	102	102	102	103	141	169	98	0.04
		0.9	**91**	94	99	95	101	99	108	103	95	0.05

Table 9: **Predictive R^2 for 1000 observations, binary design with sparse covariates.** Reported as % worse than the Oracle – MLE fit on the true nonzero covariates – across 1000 samples.

			% Worse than Oracle									
			lasso		GL $\gamma = 1$		GL $\gamma = 10$		marginal AL			
$\mathrm{sd}(\boldsymbol{\eta})/\sigma$	d	ρ	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	MCP	Oracle R^2
		0	1	1	1	1	**0**	**0**	1	1	**0**	*0.78*
	10	*0.5*	1	1	1	1	**0**	**0**	1	1	**0**	*0.78*
		0.9	1	1	1	1	**0**	**0**	1	1	**0**	*0.78*
		0	6	6	5	5	5	**4**	6	5	**4**	*0.78*
2	*50*	*0.5*	7	6	6	5	5	5	6	6	**4**	*0.78*
		0.9	7	6	6	5	5	5	7	6	**4**	*0.78*
		0	7	6	5	5	4	**3**	6	6	**3**	*0.78*
	100	*0.5*	7	6	5	5	4	**3**	7	6	**3**	*0.78*
		0.9	8	6	6	5	4	**3**	7	7	**3**	*0.78*
		0	7	6	5	4	3	2	5	5	**1**	*0.78*
	200	*0.5*	7	6	5	5	3	2	6	6	**1**	*0.78*
		0.9	8	6	5	5	3	2	7	6	**1**	*0.78*
		0	2	2	0	0	2	-1	2	3	**-2**	*0.45*
	10	*0.5*	3	3	1	1	2	**-1**	3	4	**-1**	*0.45*
		0.9	3	3	1	1	2	**-1**	3	4	**-1**	*0.45*
		0	20	18	**17**	18	31	23	18	19	18	*0.45*
1	*50*	*0.5*	22	20	**18**	19	31	23	20	21	19	*0.45*
		0.9	22	20	**19**	**19**	30	24	20	21	**19**	*0.45*
		0	26	**23**	**23**	24	38	36	**23**	24	**23**	*0.45*
	100	*0.5*	28	**24**	**24**	25	38	38	26	26	**24**	*0.45*
		0.9	29	25	**24**	25	38	39	26	27	25	*0.45*
		0	28	**24**	25	26	42	45	25	26	**24**	*0.45*
	200	*0.5*	30	**26**	**26**	28	42	50	28	28	**26**	*0.45*
		0.9	31	**26**	27	28	42	51	29	29	**26**	*0.45*
		0	-9	-8	**-14**	-13	29	-13	16	34	**-14**	*0.12*
	10	*0.5*	-5	-4	-11	-10	30	-11	18	38	**-13**	*0.12*
		0.9	-4	-3	-10	-9	33	-7	19	36	**-12**	*0.12*
		0	**49**	52	55	68	144	93	69	89	52	*0.12*
0.5	*50*	*0.5*	**55**	59	59	72	158	95	75	95	60	*0.12*
		0.9	**57**	60	60	74	150	95	76	94	61	*0.12*
		0	**64**	68	79	90	139	100	82	103	68	*0.12*
	100	*0.5*	**70**	75	82	92	146	100	88	108	76	*0.12*
		0.9	**71**	76	82	93	141	101	89	108	77	*0.12*
		0	**69**	73	94	95	127	101	86	107	73	*0.12*
	200	*0.5*	**75**	80	95	97	132	101	92	113	80	*0.12*
		0.9	**76**	81	95	97	130	101	93	113	82	*0.12*

Table 10: **Predictive R^2 for 1000 observations, continuous design with sparse covariates.** Reported as % worse than the Oracle – MLE fit on the true nonzero covariates – across 1000 samples.

			% Worse than Oracle									
			lasso		GL $\gamma = 1$		GL $\gamma = 10$		marginal AL			
$\mathrm{sd}(\boldsymbol{\eta})/\sigma$	d	ρ	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	*AICc*	*CV*	MCP	Oracle R^2
2	10	0	1	1	1	1	**0**	**0**	1	1	**0**	0.78
		0.5	4	3	3	2	1	1	7	7	**0**	0.78
		0.9	5	5	4	4	2	2	9	9	**1**	0.78
	50	0	6	6	5	5	5	**4**	6	5	**4**	0.78
		0.5	11	9	9	8	6	6	15	14	**5**	0.78
		0.9	14	10	11	9	**7**	**7**	45	44	**7**	0.78
	100	0	7	6	5	5	4	**3**	6	6	**3**	0.78
		0.5	12	9	9	7	4	5	17	15	**3**	0.78
		0.9	15	11	11	9	6	6	54	53	**5**	0.78
	200	0	7	6	5	4	3	2	5	5	**1**	0.78
		0.5	12	9	8	7	3	3	17	15	**1**	0.78
		0.9	14	11	10	9	4	5	53	52	**2**	0.78
1	10	0	2	2	1	0	2	**-1**	2	3	**-1**	0.45
		0.5	10	10	7	7	4	3	12	12	**0**	0.45
		0.9	17	17	14	13	10	8	**3**	**3**	4	0.45
	50	0	20	18	18	**17**	27	23	18	19	18	0.45
		0.5	38	32	32	29	29	34	39	38	**25**	0.45
		0.9	68	65	67	51	63	52	47	46	**30**	0.45
	100	0	26	**23**	24	24	36	36	**23**	24	**23**	0.45
		0.5	53	45	42	42	40	77	50	47	**39**	0.45
		0.9	85	86	88	83	86	87	**63**	64	68	0.45
	200	0	28	**24**	26	26	43	45	25	26	**24**	0.45
		0.5	65	55	48	57	**46**	96	54	51	54	0.45
		0.9	87	89	91	88	90	90	**71**	73	87	0.45
0.5	10	0	-8	-7	-8	-12	23	-11	16	35	**-13**	0.12
		0.5	25	28	20	18	44	12	57	66	**-5**	0.12
		0.9	16	17	16	15	12	12	-7	**-8**	7	0.12
	50	0	**49**	52	70	67	101	93	68	88	52	0.12
		0.5	**89**	94	98	96	101	100	107	119	94	0.12
		0.9	76	77	79	76	76	74	80	78	**73**	0.12
	100	0	**63**	68	91	90	102	100	81	102	67	0.12
		0.5	**94**	98	100	100	101	101	113	124	98	0.12
		0.9	**87**	88	91	88	93	88	93	91	**87**	0.12
	200	0	**69**	73	97	95	101	101	86	107	73	0.12
		0.5	**96**	98	101	100	101	101	114	126	99	0.12
		0.9	**91**	93	96	93	99	95	97	94	93	0.12

Table 11: **Predictive MSE for n=100, binary design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	0.99	0.94	1.06	0.53	0.87			
CV.min	0.59	0.63	0.84	**0.51**	0.62	0.61		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.72	0.67	0.54	0.56			0.54	$\rho = 0$
AIC	0.55	0.55	0.56	0.52				$Oracle$: 0.37
BIC	0.55	0.55	0.56	0.53				
CV.1se	0.97	0.92	0.99	0.49	0.83			
CV.min	0.58	0.60	0.79	**0.46**	0.59	0.59		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.69	0.64	0.48	0.52			0.48	$\rho = 0.5$
AIC	0.49	0.49	0.50	0.47				$Oracle$: 0.33
BIC	0.49	0.49	0.50	0.48				
CV.1se	0.93	0.89	0.96	0.47	0.80			
CV.min	0.56	0.59	0.78	**0.44**	0.58	0.58		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.67	0.63	0.46	0.50			0.46	$\rho = 0.9$
AIC	0.46	0.47	0.47	0.45				$Oracle$: 0.31
BIC	0.46	0.47	0.47	0.46				
CV.1se	2.18	2.18	2.20	1.79	2.17			
CV.min	1.91	2.00	2.13	2.03	1.93	1.92		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.91	1.92	2.21	**1.73**			2.20	$\rho = 0$
AIC	2.21	2.22	2.24	2.15				$Oracle$: 1.40
BIC	2.20	2.21	2.24	2.15				
CV.1se	1.98	1.98	1.99	1.64	1.97			
CV.min	1.75	1.82	1.93	1.83	1.77	1.75		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.74	1.76	1.97	**1.57**			1.97	$\rho = 0.5$
AIC	1.98	1.99	2.01	1.93				$Oracle$: 1.26
BIC	1.98	1.98	2.01	1.93				
CV.1se	1.88	1.87	1.88	1.54	1.86			
CV.min	1.66	1.72	1.82	1.72	1.67	1.67		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.66	1.67	1.86	**1.5**			1.86	$\rho = 0.9$
AIC	1.87	1.88	1.90	1.83				$Oracle$: 1.19
BIC	1.87	1.88	1.90	1.82				
CV.1se	5.67	5.67	5.68	6.91	5.67			
CV.min	5.68	5.70	5.71	8.23	5.72	5.72		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**5.61**	7.11	8.94	6.01			8.94	$\rho = 0$
AIC	8.88	8.93	9.00	8.74				$Oracle$: 5.30
BIC	8.87	8.92	9.00	8.73				
CV.1se	5.08	5.08	5.08	6.21	5.08			
CV.min	5.09	5.11	5.11	7.39	5.13	5.13		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**5.03**	6.20	7.98	5.41			7.99	$\rho = 0.5$
AIC	7.93	7.98	8.04	7.81				$Oracle$: 4.74
BIC	7.93	7.97	8.04	7.81				
CV.1se	4.82	4.83	4.83	5.84	4.83			
CV.min	4.84	4.85	4.86	6.96	4.86	4.89		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**4.77**	5.83	7.57	5.14			7.56	$\rho = 0.9$
AIC	7.53	7.57	7.63	7.41				$Oracle$: 4.52
BIC	7.52	7.56	7.63	7.40				

Table 12: **Predictive MSE for n=100, binary design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	7.33	7.44	7.46	3.26	7.34			
CV.min	5.91	6.93	7.27	2.95	5.82	6.07		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	6.28	3.35	3.02	4.31			3.02	$\rho = 0$
AIC	2.98	3.00	3.03	**2.94**				$Oracle$: 2.73
BIC	2.98	3.00	3.03	**2.94**				
CV.1se	6.67	6.68	6.71	2.96	6.66			
CV.min	5.46	6.27	6.57	2.64	5.45	5.56		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.70	3.11	2.70	3.86			2.71	$\rho = 0.5$
AIC	2.67	2.68	2.71	**2.63**				$Oracle$: 2.45
BIC	2.67	2.68	2.71	**2.63**				
CV.1se	6.28	6.30	6.35	2.89	6.29			
CV.min	5.24	5.94	6.21	2.51	5.27	5.32		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.46	3.15	2.55	3.77			2.55	$\rho = 0.9$
AIC	2.52	2.54	2.56	**2.49**				$Oracle$: 2.31
BIC	2.52	2.54	2.56	**2.49**				
CV.1se	12.07	12.11	12.12	10.25	12.07			
CV.min	11.33	11.94	12.07	11.32	11.41	11.48		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	11.31	11.06	12.10	**10.12**			12.09	$\rho = 0$
AIC	11.96	12.05	12.14	11.78				$Oracle$: 9.58
BIC	11.96	12.04	12.14	11.77				
CV.1se	10.82	10.84	10.85	9.17	10.82			
CV.min	10.25	10.69	10.82	10.09	10.33	10.36		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	10.15	9.82	10.78	**9.06**			10.78	$\rho = 0.5$
AIC	10.66	10.73	10.82	10.49				$Oracle$: 8.54
BIC	10.65	10.72	10.82	10.49				
CV.1se	10.25	10.27	10.27	8.73	10.26			
CV.min	9.73	10.12	10.23	9.51	9.75	9.80		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	9.66	9.31	10.20	**8.66**			10.21	$\rho = 0.9$
AIC	10.09	10.16	10.24	9.93				$Oracle$: 8.05
BIC	10.08	10.15	10.24	9.93				
CV.1se	30.53	30.55	30.60	37.75	30.56			
CV.min	30.69	30.74	30.82	44.89	30.81	30.94		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**30.41**	45.69	48.52	32.65			48.53	$\rho = 0$
AIC	47.87	48.29	48.60	47.19				$Oracle$: 31.48
BIC	47.84	48.27	48.60	47.17				
CV.1se	27.31	27.33	27.33	33.73	27.33			
CV.min	27.44	27.49	27.51	39.84	27.55	27.71		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**27.22**	40.56	43.22	29.07			43.30	$\rho = 0.5$
AIC	42.66	43.03	43.30	42.06				$Oracle$: 28.08
BIC	42.64	43.01	43.30	42.04				
CV.1se	25.85	25.87	25.88	31.38	25.87			
CV.min	26.00	25.97	26.03	37.38	26.07	26.25		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**25.67**	38.25	40.92	27.59			41.08	$\rho = 0.9$
AIC	40.38	40.73	40.99	39.78				$Oracle$: 26.61
BIC	40.36	40.71	40.99	39.76				

Table 13: **Predictive MSE for n=100, binary design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	14.97	15.13	15.17	6.70	15.02			
CV.min	12.62	14.61	14.91	5.99	12.53	12.89		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	13.31	6.05	6.12	9.01			6.14	$\rho = 0$
AIC	6.04	6.08	6.13	**5.96**				$Oracle$: 6.12
BIC	6.04	6.08	6.13	**5.96**				
CV.1se	13.48	13.54	13.55	6.03	13.50			
CV.min	11.56	13.10	13.37	5.35	11.65	11.77		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	11.88	5.49	5.44	8.14			5.46	$\rho = 0.5$
AIC	5.37	5.41	5.45	5.31				$Oracle$: 5.45
BIC	5.37	5.41	5.45	**5.3**				
CV.1se	12.74	12.81	12.84	5.92	12.80			
CV.min	10.99	12.38	12.67	5.11	10.93	11.21		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	11.29	5.27	5.17	7.86			5.16	$\rho = 0.9$
AIC	5.10	5.14	5.18	**5.04**				$Oracle$: 5.16
BIC	5.10	5.13	5.18	**5.04**				
CV.1se	24.48	24.56	24.57	20.88	24.50			
CV.min	23.19	24.40	24.52	22.96	23.24	23.46		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	23.11	23.13	24.53	**20.63**			24.52	$\rho = 0$
AIC	24.21	24.42	24.58	23.85				$Oracle$: 21.34
BIC	24.20	24.41	24.58	23.84				
CV.1se	21.91	21.95	21.95	18.66	21.94			
CV.min	20.91	21.80	21.92	20.46	21.03	21.13		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	20.78	20.54	21.87	**18.48**			21.87	$\rho = 0.5$
AIC	21.58	21.76	21.91	21.26				$Oracle$: 19.00
BIC	21.57	21.76	21.91	21.25				
CV.1se	20.67	20.71	20.72	17.65	20.70			
CV.min	19.66	20.53	20.67	19.21	19.67	19.78		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	19.53	19.34	20.61	**17.53**			20.58	$\rho = 0.9$
AIC	20.35	20.51	20.66	20.05				$Oracle$: 17.97
BIC	20.34	20.50	20.66	20.04				
CV.1se	61.84	61.86	61.92	76.46	61.85			
CV.min	62.12	62.25	62.34	90.65	62.44	62.36		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**61.54**	94.48	98.16	66.07			98.14	$\rho = 0$
AIC	96.74	97.74	98.25	95.38				$Oracle$: 64.46
BIC	96.70	97.70	98.25	95.35				
CV.1se	55.33	55.40	55.36	68.27	55.34			
CV.min	55.59	55.77	55.74	80.79	55.83	56.06		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**55.07**	83.89	87.52	59.02			87.55	$\rho = 0.5$
AIC	86.29	87.15	87.62	85.08				$Oracle$: 57.58
BIC	86.25	87.11	87.62	85.05				
CV.1se	52.31	52.35	52.39	63.43	52.34			
CV.min	52.51	52.62	52.66	75.65	52.69	52.76		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**51.93**	79.08	82.74	55.84			82.80	$\rho = 0.9$
AIC	81.57	82.38	82.83	80.38				$Oracle$: 54.48
BIC	81.52	82.35	82.83	80.28				

Table 14: **Predictive MSE for n=100, binary design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	30.33	30.56	30.60	13.61	30.38			
CV.min	26.07	29.77	30.17	12.06	25.72	26.61		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	27.01	12.04	12.33	18.27			12.32	$\rho = 0$
AIC	12.15	12.26	12.34	**12**				
BIC	12.15	12.26	12.34	**12**				$Oracle$: 12.55
CV.1se	27.21	27.33	27.35	12.36	27.28			
CV.min	23.89	26.73	27.01	10.79	23.88	24.36		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	24.26	10.74	10.99	16.73			11.03	$\rho = 0.5$
AIC	10.83	10.93	11.00	**10.7**				
BIC	10.83	10.92	11.00	**10.7**				$Oracle$: 11.21
CV.1se	25.68	25.79	25.82	11.97	25.74			
CV.min	22.64	25.13	25.46	10.24	22.44	22.96		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	22.74	10.23	10.38	15.86			10.38	$\rho = 0.9$
AIC	10.24	10.33	10.39	**10.12**				
BIC	10.23	10.32	10.39	**10.12**				$Oracle$: 10.60
CV.1se	49.21	49.37	49.37	42.14	49.29			
CV.min	46.77	49.09	49.30	46.25	46.84	47.45		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	46.69	47.26	49.34	**41.64**			49.49	$\rho = 0$
AIC	48.63	49.11	49.40	47.93				
BIC	48.61	49.09	49.40	47.91				$Oracle$: 46.19
CV.1se	44.03	44.14	44.15	37.50	44.11			
CV.min	42.08	43.93	44.11	41.17	42.30	42.64		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	41.73	42.04	43.94	**37.24**			43.91	$\rho = 0.5$
AIC	43.31	43.73	43.99	42.68				
BIC	43.29	43.72	43.99	42.67				$Oracle$: 41.04
CV.1se	41.58	41.69	41.70	35.58	41.60			
CV.min	39.52	41.37	41.58	38.66	39.66	39.88		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	39.23	39.74	41.49	**35.18**			41.47	$\rho = 0.9$
AIC	40.90	41.29	41.54	40.32				
BIC	40.88	41.27	41.54	40.30				$Oracle$: 38.90
CV.1se	124.66	124.81	124.79	154.61	124.68			
CV.min	125.32	125.62	125.84	182.91	125.93	126.26		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**124.15**	193.36	198.18	133.05			198.35	$\rho = 0$
AIC	195.19	197.42	198.29	192.44				
BIC	195.11	197.36	198.28	192.34				$Oracle$: 130.14
CV.1se	111.25	111.38	111.34	136.84	111.28			
CV.min	111.79	112.04	112.02	162.37	112.21	112.54		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**110.75**	171.44	176.10	118.55			175.96	$\rho = 0.5$
AIC	173.46	175.42	176.20	171.07				
BIC	173.39	175.35	176.19	171.01				$Oracle$: 116.03
CV.1se	105.14	105.23	105.25	127.70	105.21			
CV.min	105.41	105.68	105.77	152.09	105.93	105.96		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**104.31**	161.77	166.42	112.41			166.20	$\rho = 0.9$
AIC	163.88	165.73	166.50	161.47				
BIC	163.80	165.66	166.50	161.41				$Oracle$: 109.94

Table 15: **Predictive MSE for n=100, continuous design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	4.07	3.93	4.31	2.11	3.58			
CV.min	2.44	2.60	3.40	**2.03**	2.52	2.53		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	2.89	3.36	2.23	2.24			2.39	$\rho = 0$
AIC	2.20	2.21	2.24	2.10				$Oracle$: 1.48
BIC	2.20	2.20	2.23	2.15				
CV.1se	2.01	1.97	1.89	1.04	1.82			
CV.min	1.54	1.55	1.68	0.84	1.44	1.50		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.57	1.81	1.01	1.16			1.26	$\rho = 0.5$
AIC	0.83	0.84	0.84	**0.82**				$Oracle$: 0.56
BIC	0.83	0.84	0.84	0.91				
CV.1se	0.40	0.39	0.34	0.29	0.37			
CV.min	0.32	0.32	0.32	0.22	0.31	0.32		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.32	0.35	0.33	0.25			0.32	$\rho = 0.9$
AIC	0.22	0.22	0.22	**0.2**				$Oracle$: 0.15
BIC	0.24	0.23	0.22	0.32				
CV.1se	8.82	8.80	8.92	7.23	8.80			
CV.min	7.73	8.04	8.56	8.16	7.76	7.79		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.66	8.50	8.88	**6.93**			8.56	$\rho = 0$
AIC	8.87	8.91	9.00	8.65				$Oracle$: 5.62
BIC	8.87	8.91	9.00	8.63				
CV.1se	3.39	3.38	3.36	2.83	3.36			
CV.min	3.11	3.16	3.26	3.07	3.11	3.10		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.08	3.29	3.31	**2.79**			3.20	$\rho = 0.5$
AIC	3.35	3.36	3.39	3.28				$Oracle$: 2.11
BIC	3.35	3.36	3.39	3.27				
CV.1se	0.84	0.82	0.74	0.72	0.79			
CV.min	0.71	0.71	0.69	0.70	0.69	**0.69**		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.70	0.74	0.71	**0.68**			0.70	$\rho = 0.9$
AIC	0.89	0.89	0.91	0.80				$Oracle$: 0.56
BIC	0.89	0.89	0.91	0.70				
CV.1se	22.83	22.84	22.85	27.74	22.85			
CV.min	22.87	22.91	23.01	33.04	22.94	22.99		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**22.53**	24.53	35.87	24.03			33.38	$\rho = 0$
AIC	35.61	35.81	36.11	35.06				$Oracle$: 21.25
BIC	35.59	35.80	36.10	35.04				
CV.1se	8.59	8.59	8.60	10.06	8.59			
CV.min	8.58	8.59	8.64	12.07	8.62	8.65		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**8.52**	8.61	13.38	9.09			11.49	$\rho = 0.5$
AIC	13.39	13.44	13.56	13.17				$Oracle$: 7.97
BIC	13.38	13.44	13.56	13.15				
CV.1se	2.33	2.32	2.32	2.29	2.32			
CV.min	2.26	2.26	2.29	2.53	2.26	**2.26**		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**2.24**	2.28	3.11	2.34			2.28	$\rho = 0.9$
AIC	3.61	3.62	3.67	3.44				$Oracle$: 2.11
BIC	3.60	3.62	3.67	2.66				

Table 16: **Predictive MSE for n=100, continuous design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	29.84	30.21	30.39	13.26	29.97			
CV.min	24.06	28.29	29.64	11.90	24.04	24.66		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	25.41	22.67	12.22	17.14			14.70	$\rho = 0$
AIC	12.07	12.15	12.26	11.89				$Oracle$: 11.08
BIC	12.07	12.14	12.26	**11.88**				
CV.1se	10.41	10.41	10.42	5.40	10.39			
CV.min	9.40	9.94	10.30	4.26	9.42	9.43		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	9.31	10.16	4.16	6.64			5.91	$\rho = 0.5$
AIC	4.13	4.15	4.18	4.09				$Oracle$: 3.78
BIC	4.13	4.14	4.18	**4.08**				
CV.1se	1.88	1.86	1.83	1.54	1.85			
CV.min	1.60	1.61	1.69	1.12	1.59	1.58		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.55	1.78	1.31	1.26			1.53	$\rho = 0.9$
AIC	0.75	0.75	0.76	**0.74**				$Oracle$: 0.68
BIC	0.75	0.75	0.76	1.38				
CV.1se	48.97	49.08	49.11	41.41	49.03			
CV.min	46.03	48.36	48.95	45.64	46.16	46.53		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	45.69	46.15	48.71	**40.67**			47.97	$\rho = 0$
AIC	48.15	48.51	48.87	47.37				$Oracle$: 38.53
BIC	48.13	48.49	48.86	47.35				
CV.1se	16.82	16.83	16.85	14.38	16.81			
CV.min	16.23	16.58	16.82	15.44	16.19	16.25		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	16.03	16.57	16.64	**14.36**			16.44	$\rho = 0.5$
AIC	16.54	16.62	16.77	16.30				$Oracle$: 13.23
BIC	16.53	16.61	16.76	16.29				
CV.1se	3.06	3.06	3.06	2.82	3.06			
CV.min	2.89	2.90	2.99	**2.61**	2.88	2.88		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.83	3.01	2.98	2.64			2.84	$\rho = 0.9$
AIC	2.99	3.00	3.04	2.88				$Oracle$: 2.37
BIC	2.99	3.00	3.04	2.87				
CV.1se	123.67	123.68	123.80	151.41	123.69			
CV.min	124.09	124.31	124.59	180.32	125.12	125.16		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**122.78**	181.19	195.40	131.22			183.19	$\rho = 0$
AIC	192.75	194.48	195.68	189.98				$Oracle$: 126.96
BIC	192.67	194.40	195.66	189.91				
CV.1se	42.38	42.39	42.42	49.61	42.42			
CV.min	42.56	42.60	42.70	59.52	42.68	42.99		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**42.17**	50.84	66.80	45.06			59.79	$\rho = 0.5$
AIC	66.10	66.57	67.06	65.12				$Oracle$: 43.47
BIC	66.07	66.53	67.05	65.09				
CV.1se	7.73	7.73	7.74	7.84	7.73			
CV.min	7.71	7.73	7.78	8.64	7.74	7.76		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**7.66**	7.72	12.06	8.10			7.97	$\rho = 0.9$
AIC	11.97	12.05	12.19	11.58				$Oracle$: 7.75
BIC	11.96	12.05	12.18	10.18				

Table 17: **Predictive MSE for n=100, continuous design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	61.16	61.57	61.63	27.47	61.23			
CV.min	51.50	59.56	60.70	24.23	51.80	52.42		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	53.49	32.73	24.78	36.31			29.58	$\rho = 0$
AIC	24.45	24.64	24.82	**24.13**				$Oracle$: 24.83
BIC	24.44	24.63	24.82	24.14				
CV.1se	20.83	20.84	20.86	10.87	20.84			
CV.min	19.15	20.19	20.68	8.57	19.09	19.18		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	18.93	18.83	8.35	13.38			11.41	$\rho = 0.5$
AIC	8.26	8.30	8.37	**8.18**				$Oracle$: 8.37
BIC	8.25	8.30	8.37	8.21				
CV.1se	3.54	3.54	3.53	3.00	3.54			
CV.min	3.20	3.27	3.41	2.17	3.21	3.20		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.11	3.48	1.60	2.48			3.07	$\rho = 0.9$
AIC	1.40	1.40	1.42	**1.38**				$Oracle$: 1.42
BIC	1.40	1.40	1.42	2.30				
CV.1se	99.62	99.74	99.82	84.51	99.66			
CV.min	94.55	98.98	99.72	92.58	94.75	95.42		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	93.78	93.69	99.07	**83.67**			97.14	$\rho = 0$
AIC	97.75	98.62	99.27	96.27				$Oracle$: 86.46
BIC	97.71	98.58	99.26	96.23				
CV.1se	33.64	33.67	33.71	**28.79**	33.68			
CV.min	32.47	33.31	33.69	30.80	32.52	32.68		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	32.08	32.43	33.36	28.83			33.03	$\rho = 0.5$
AIC	33.02	33.24	33.49	32.55				$Oracle$: 29.19
BIC	33.00	33.22	33.49	32.53				
CV.1se	5.73	5.73	5.73	5.38	5.74			
CV.min	5.53	5.59	5.70	**4.97**	5.53	5.53		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.44	5.70	5.62	5.05			5.46	$\rho = 0.9$
AIC	5.58	5.61	5.68	5.42				$Oracle$: 4.90
BIC	5.58	5.61	5.68	5.44				
CV.1se	250.85	250.88	251.03	307.99	251.08			
CV.min	251.92	252.45	253.02	365.30	253.21	254.15		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**249.33**	381.45	396.97	266.84			369.87	$\rho = 0$
AIC	391.16	395.18	397.28	385.61				$Oracle$: 260.93
BIC	390.99	395.04	397.25	385.45				
CV.1se	84.75	84.79	84.80	98.73	84.80			
CV.min	85.25	85.31	85.31	118.99	85.26	85.82		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**84.43**	117.72	133.55	90.21			120.78	$\rho = 0.5$
AIC	131.83	132.94	133.82	129.89				$Oracle$: 87.87
BIC	131.76	132.88	133.81	129.82				
CV.1se	14.44	14.44	14.45	14.67	14.45			
CV.min	14.44	14.49	14.54	16.22	14.49	14.53		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**14.39**	14.47	22.61	15.14			15.23	$\rho = 0.9$
AIC	22.32	22.50	22.75	21.62				$Oracle$: 14.79
BIC	22.31	22.50	22.74	18.94				

Table 18: **Predictive MSE for n=100, continuous design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	123.78	124.17	124.38	55.67	123.87			
CV.min	105.81	121.52	122.75	48.79	106.45	108.24		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	109.36	52.25	49.94	74.35			58.01	$\rho = 0$
AIC	49.18	49.63	49.96	48.59				$Oracle$: 50.89
BIC	49.16	49.61	49.96	**48.58**				
CV.1se	41.62	41.63	41.66	21.97	41.60			
CV.min	38.52	40.66	41.36	17.13	38.32	38.69		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	37.84	29.69	16.67	26.77			22.67	$\rho = 0.5$
AIC	16.46	16.57	16.70	16.31				$Oracle$: 17.03
BIC	16.45	16.57	16.69	**16.3**				
CV.1se	6.86	6.85	6.85	5.93	6.86			
CV.min	6.37	6.53	6.75	4.25	6.36	6.35		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	6.19	6.79	2.75	4.94			5.95	$\rho = 0.9$
AIC	2.70	2.71	2.74	**2.67**				$Oracle$: 2.80
BIC	2.69	2.71	2.74	4.17				
CV.1se	200.18	200.56	200.62	170.55	200.38			
CV.min	190.91	199.28	200.41	186.30	190.80	193.05		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	189.24	191.81	199.68	**168.56**			197.28	$\rho = 0$
AIC	196.78	198.74	199.88	193.84				$Oracle$: 186.60
BIC	196.71	198.66	199.87	193.77				
CV.1se	67.24	67.30	67.34	**57.55**	67.30			
CV.min	64.84	66.87	67.31	61.27	64.94	65.33		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	64.19	63.51	66.78	**57.55**			66.20	$\rho = 0.5$
AIC	65.93	66.46	66.92	65.00				$Oracle$: 62.50
BIC	65.88	66.43	66.91	64.97				
CV.1se	11.08	11.07	11.08	10.48	11.08			
CV.min	10.75	10.89	11.04	**9.69**	10.77	10.78		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	10.58	11.04	10.92	9.86			10.61	$\rho = 0.9$
AIC	10.79	10.87	10.99	10.50				$Oracle$: 10.21
BIC	10.79	10.87	10.99	10.60				
CV.1se	505.57	505.68	505.88	621.63	505.30			
CV.min	507.03	508.25	509.82	736.30	509.71	511.25		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**502.04**	779.80	797.64	536.72			735.78	$\rho = 0$
AIC	787.28	796.26	799.84	776.11				$Oracle$: 527.53
BIC	786.99	795.99	799.78	775.79				
CV.1se	169.34	169.55	169.49	197.63	169.47			
CV.min	170.16	170.31	170.41	237.39	170.31	171.26		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**168.77**	252.44	267.51	180.60			241.61	$\rho = 0.5$
AIC	263.70	266.29	267.81	259.78				$Oracle$: 176.63
BIC	263.52	266.19	267.78	259.63				
CV.1se	27.83	27.83	27.85	28.27	27.84			
CV.min	27.80	27.97	28.03	31.23	27.92	27.95		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**27.75**	28.33	43.63	29.27			29.04	$\rho = 0.9$
AIC	43.01	43.43	43.86	41.67				$Oracle$: 28.81
BIC	42.99	43.41	43.84	36.55				

Table 19: **Predictive MSE for n=100, binary design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	0.64	0.57	0.63	**0.4**	0.47			
CV.min	0.42	**0.4**	0.46	0.41	**0.4**	**0.41**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.48	0.43	0.46	**0.4**			0.45	$\rho = 0$
AIC	0.47	0.47	0.48	0.44				$Oracle$: 0.27
BIC	0.47	0.47	0.48	0.44				
CV.1se	0.65	0.57	0.63	0.38	0.46			
CV.min	0.40	0.38	0.45	0.38	**0.37**	**0.38**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.47	0.41	0.41	0.39			0.41	$\rho = 0.5$
AIC	0.42	0.42	0.43	0.40				$Oracle$: 0.24
BIC	0.42	0.42	0.43	0.40				
CV.1se	0.64	0.56	0.63	**0.36**	0.45			
CV.min	0.39	0.38	0.45	**0.36**	**0.36**	**0.38**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.46	0.40	0.38	0.38			**0.38**	$\rho = 0.9$
AIC	0.40	0.40	0.41	0.38				$Oracle$: 0.23
BIC	0.40	0.40	0.41	0.38				
CV.1se	1.86	1.86	1.89	1.52	1.84			
CV.min	1.58	1.65	1.78	1.74	1.60	1.59		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.58	1.60	1.91	**1.45**			1.91	$\rho = 0$
AIC	1.91	1.92	1.94	1.86				$Oracle$: 1.09
BIC	1.91	1.92	1.94	1.85				
CV.1se	1.69	1.68	1.70	1.39	1.67			
CV.min	1.46	1.50	1.62	1.57	1.47	1.46		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.45	1.46	1.70	**1.32**			1.70	$\rho = 0.5$
AIC	1.71	1.72	1.74	1.66				$Oracle$: 0.97
BIC	1.71	1.72	1.73	1.66				
CV.1se	1.60	1.60	1.62	1.31	1.58			
CV.min	1.39	1.43	1.54	1.48	1.40	1.39		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.39	1.40	1.61	**1.26**			1.61	$\rho = 0.9$
AIC	1.62	1.63	1.64	1.58				$Oracle$: 0.92
BIC	1.62	1.63	1.64	1.57				
CV.1se	4.92	4.92	4.93	5.99	4.92			
CV.min	4.92	4.94	4.97	7.11	4.96	4.96		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**4.87**	5.98	7.74	5.20			7.74	$\rho = 0$
AIC	7.69	7.74	7.80	7.57				$Oracle$: 4.35
BIC	7.69	7.73	7.80	7.57				
CV.1se	4.40	4.40	4.41	5.38	4.40			
CV.min	4.41	4.42	4.43	6.39	4.44	4.44		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**4.36**	5.23	6.91	4.66			6.91	$\rho = 0.5$
AIC	6.87	6.91	6.97	6.77				$Oracle$: 3.90
BIC	6.87	6.91	6.97	6.76				
CV.1se	4.18	4.18	4.18	5.02	4.18			
CV.min	4.18	4.19	4.21	6.00	4.20	4.21		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**4.13**	4.86	6.53	4.42			6.54	$\rho = 0.9$
AIC	6.50	6.54	6.59	6.40				$Oracle$: 3.69
BIC	6.50	6.53	6.59	6.39				

Table 20: **Predictive MSE for n=100, binary design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	1.47	1.35	1.90	0.84	1.13			
CV.min	0.91	0.88	1.34	0.86	0.87	0.87		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.06	**0.83**	0.97	0.86			0.97	$\rho = 0$
AIC	0.98	0.98	1.00	0.93				$Oracle$: 0.56
BIC	0.98	0.98	1.00	0.92				
CV.1se	1.54	1.43	1.82	**0.79**	1.17			
CV.min	0.89	0.89	1.39	**0.79**	0.85	0.86		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.07	**0.79**	0.86	0.83			0.86	$\rho = 0.5$
AIC	0.88	0.88	0.89	0.84				$Oracle$: 0.50
BIC	0.88	0.88	0.89	0.84				
CV.1se	1.50	1.40	1.78	**0.76**	1.18			
CV.min	0.87	0.90	1.37	**0.76**	0.84	0.85		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.05	0.79	0.81	0.82			0.82	$\rho = 0.9$
AIC	0.83	0.83	0.84	0.79				$Oracle$: 0.48
BIC	0.83	0.83	0.84	0.79				
CV.1se	3.93	3.96	4.00	3.22	3.93			
CV.min	3.41	3.65	3.89	3.67	3.44	3.45		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.43	3.42	3.99	**3.09**			3.99	$\rho = 0$
AIC	3.97	3.99	4.03	3.87				$Oracle$: 2.25
BIC	3.96	3.99	4.03	3.86				
CV.1se	3.54	3.54	3.58	2.93	3.54			
CV.min	3.14	3.32	3.49	3.29	3.17	3.16		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.13	3.09	3.55	**2.82**			3.56	$\rho = 0.5$
AIC	3.54	3.56	3.59	3.46				$Oracle$: 2.01
BIC	3.54	3.55	3.59	3.45				
CV.1se	3.34	3.36	3.38	2.77	3.33			
CV.min	2.98	3.15	3.30	3.08	3.00	3.00		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.98	2.94	3.35	**2.68**			3.34	$\rho = 0.9$
AIC	3.34	3.35	3.39	3.26				$Oracle$: 1.90
BIC	3.33	3.35	3.39	3.26				
CV.1se	10.17	10.17	10.19	12.43	10.17			
CV.min	10.17	10.22	10.26	14.81	10.28	10.23		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**10.09**	14.04	16.09	10.77			16.07	$\rho = 0$
AIC	15.93	16.04	16.16	15.68				$Oracle$: 9.00
BIC	15.92	16.03	16.16	15.66				
CV.1se	9.09	9.10	9.11	11.13	9.10			
CV.min	9.13	9.13	9.16	13.22	9.18	9.18		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**9.02**	12.34	14.33	9.64			14.32	$\rho = 0.5$
AIC	14.20	14.29	14.40	13.98				$Oracle$: 8.05
BIC	14.19	14.29	14.40	13.97				
CV.1se	8.59	8.60	8.60	10.43	8.59			
CV.min	8.62	8.64	8.65	12.40	8.66	8.71		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**8.52**	11.58	13.53	9.14			13.53	$\rho = 0.9$
AIC	13.40	13.49	13.60	13.19				$Oracle$: 7.61
BIC	13.39	13.48	13.59	13.18				

Table 21: **Predictive MSE for n=100, binary design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	1.64	1.52	2.13	0.93	1.27			
CV.min	1.01	0.98	1.54	0.96	0.97	0.98		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.18	**0.92**	1.08	0.96			1.08	$\rho = 0$
AIC	1.09	1.09	1.11	1.03				$Oracle$: 0.62
BIC	1.09	1.09	1.11	1.02				
CV.1se	1.73	1.61	2.07	0.88	1.31			
CV.min	1.00	1.00	1.58	0.88	0.95	0.96		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.19	**0.86**	0.96	0.92			0.96	$\rho = 0.5$
AIC	0.97	0.97	0.99	0.93				$Oracle$: 0.56
BIC	0.97	0.97	0.99	0.93				
CV.1se	1.68	1.57	2.00	0.85	1.33			
CV.min	0.97	1.02	1.56	**0.84**	0.93	0.95		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.17	0.86	0.91	0.90			0.91	$\rho = 0.9$
AIC	0.92	0.92	0.93	0.88				$Oracle$: 0.53
BIC	0.92	0.92	0.93	0.88				
CV.1se	4.37	4.39	4.44	3.57	4.36			
CV.min	3.79	4.08	4.32	4.07	3.83	3.85		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.81	3.81	4.44	**3.44**			4.44	$\rho = 0$
AIC	4.41	4.43	4.48	4.30				$Oracle$: 2.50
BIC	4.40	4.43	4.48	4.29				
CV.1se	3.93	3.94	3.97	3.25	3.93			
CV.min	3.50	3.70	3.89	3.66	3.54	3.54		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.48	3.43	3.95	**3.13**			3.95	$\rho = 0.5$
AIC	3.93	3.95	3.99	3.84				$Oracle$: 2.23
BIC	3.93	3.95	3.99	3.84				
CV.1se	3.72	3.74	3.76	3.08	3.71			
CV.min	3.31	3.52	3.68	3.43	3.34	3.34		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.32	3.26	3.73	**2.98**			3.73	$\rho = 0.9$
AIC	3.71	3.73	3.77	3.63				$Oracle$: 2.11
BIC	3.71	3.73	3.77	3.63				
CV.1se	11.29	11.30	11.32	13.82	11.30			
CV.min	11.31	11.36	11.41	16.47	11.43	11.40		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**11.21**	15.81	17.90	11.99			17.88	$\rho = 0$
AIC	17.71	17.84	17.97	17.43				$Oracle$: 9.99
BIC	17.70	17.83	17.97	17.42				
CV.1se	10.09	10.09	10.10	12.37	10.09			
CV.min	10.15	10.14	10.17	14.68	10.19	10.25		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**10**	13.91	15.92	10.71			15.95	$\rho = 0.5$
AIC	15.76	15.87	15.99	15.52				$Oracle$: 8.94
BIC	15.76	15.86	15.99	15.51				
CV.1se	9.54	9.55	9.56	11.59	9.54			
CV.min	9.59	9.59	9.61	13.78	9.62	9.66		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**9.46**	13.05	15.04	10.15			15.03	$\rho = 0.9$
AIC	14.89	14.99	15.10	14.65				$Oracle$: 8.45
BIC	14.88	14.98	15.10	14.65				

Table 22: **Predictive MSE for n=100, binary design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	1.73	1.60	2.24	0.98	1.33			
CV.min	1.07	1.04	1.63	1.01	1.03	1.02		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.24	**0.96**	1.14	1.01			1.14	$\rho = 0$
AIC	1.15	1.15	1.17	1.09				$Oracle$: 0.66
BIC	1.15	1.15	1.17	1.08				
CV.1se	1.83	1.71	2.19	0.92	1.39			
CV.min	1.05	1.06	1.68	0.93	1.00	1.02		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.25	**0.9**	1.02	0.97			1.02	$\rho = 0.5$
AIC	1.03	1.03	1.04	0.98				$Oracle$: 0.59
BIC	1.03	1.03	1.04	0.98				
CV.1se	1.77	1.66	2.11	**0.89**	1.41			
CV.min	1.02	1.08	1.65	**0.89**	0.99	1.01		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.24	0.90	0.96	0.95			0.96	$\rho = 0.9$
AIC	0.97	0.97	0.99	0.93				$Oracle$: 0.56
BIC	0.97	0.97	0.99	0.93				
CV.1se	4.60	4.63	4.68	3.77	4.60			
CV.min	4.00	4.31	4.56	4.29	4.04	4.06		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	4.02	4.02	4.68	**3.62**			4.68	$\rho = 0$
AIC	4.64	4.67	4.72	4.53				$Oracle$: 2.63
BIC	4.64	4.67	4.72	4.52				
CV.1se	4.15	4.16	4.20	3.44	4.15			
CV.min	3.69	3.92	4.11	3.86	3.73	3.75		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.68	3.62	4.18	**3.31**			4.18	$\rho = 0.5$
AIC	4.15	4.18	4.22	4.06				$Oracle$: 2.36
BIC	4.15	4.17	4.22	4.06				
CV.1se	3.92	3.95	3.97	3.25	3.91			
CV.min	3.50	3.71	3.88	3.62	3.53	3.53		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.51	3.44	3.94	**3.14**			3.93	$\rho = 0.9$
AIC	3.91	3.94	3.97	3.83				$Oracle$: 2.23
BIC	3.91	3.93	3.97	3.82				
CV.1se	11.92	11.93	11.95	14.58	11.93			
CV.min	11.93	11.99	12.04	17.34	12.05	12.01		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**11.84**	16.71	18.88	12.64			18.88	$\rho = 0$
AIC	18.67	18.80	18.95	18.38				$Oracle$: 10.54
BIC	18.66	18.80	18.95	18.37				
CV.1se	10.65	10.66	10.67	13.06	10.65			
CV.min	10.72	10.71	10.73	15.50	10.77	10.78		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**10.57**	14.75	16.82	11.29			16.83	$\rho = 0.5$
AIC	16.65	16.76	16.89	16.39				$Oracle$: 9.44
BIC	16.64	16.75	16.89	16.38				
CV.1se	10.06	10.07	10.07	12.21	10.06			
CV.min	10.12	10.13	10.12	14.51	10.13	10.21		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**9.97**	13.86	15.85	10.70			15.87	$\rho = 0.9$
AIC	15.69	15.79	15.92	15.44				$Oracle$: 8.92
BIC	15.68	15.79	15.91	15.43				

Table 23: **Predictive MSE for n=100, continuous design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	2.65	2.33	2.63	1.63	1.93			
CV.min	1.71	1.64	1.90	1.64	**1.61**	1.65		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.96	1.96	1.87	1.63			1.85	$\rho = 0$
AIC	1.89	1.89	1.92	1.77				$Oracle$: 1.09
BIC	1.89	1.89	1.92	1.77				
CV.1se	1.76	1.68	1.59	0.92	1.46			
CV.min	1.27	1.26	1.37	0.75	1.13	1.22		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.32	1.51	0.95	1.00			1.08	$\rho = 0.5$
AIC	0.75	0.75	0.76	**0.73**				$Oracle$: 0.43
BIC	0.75	0.75	0.76	0.85				
CV.1se	0.38	0.36	0.32	0.26	0.33			
CV.min	0.29	0.29	0.29	0.20	0.28	0.28		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.29	0.33	0.32	0.22			0.29	$\rho = 0.9$
AIC	0.19	0.19	0.20	**0.18**				$Oracle$: 0.11
BIC	0.20	0.20	0.20	0.30				
CV.1se	7.53	7.48	7.59	6.10	7.45			
CV.min	6.40	6.61	7.19	6.97	6.46	6.47		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.35	7.08	7.66	**5.83**			7.24	$\rho = 0$
AIC	7.68	7.71	7.80	7.45				$Oracle$: 4.37
BIC	7.67	7.71	7.80	7.42				
CV.1se	3.04	3.03	3.00	2.54	3.00			
CV.min	2.76	2.79	2.88	2.75	2.75	2.74		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.72	2.92	2.94	**2.47**			2.85	$\rho = 0.5$
AIC	3.01	3.02	3.05	2.93				$Oracle$: 1.71
BIC	3.00	3.01	3.04	2.92				
CV.1se	0.76	0.74	0.68	0.65	0.71			
CV.min	0.65	0.64	0.63	0.62	0.63	0.63		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.64	0.68	0.66	**0.61**			0.64	$\rho = 0.9$
AIC	0.78	0.78	0.80	0.71				$Oracle$: 0.45
BIC	0.78	0.78	0.80	0.64				
CV.1se	19.79	19.80	19.81	23.84	19.80			
CV.min	19.76	19.83	19.97	28.51	19.86	19.92		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**19.54**	20.74	31.03	20.74			28.50	$\rho = 0$
AIC	30.82	30.99	31.25	30.32				$Oracle$: 17.46
BIC	30.81	30.98	31.25	30.30				
CV.1se	7.76	7.76	7.77	9.11	7.76			
CV.min	7.76	7.77	7.81	10.85	7.79	7.80		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**7.68**	7.76	12.06	8.19			10.37	$\rho = 0.5$
AIC	12.08	12.13	12.24	11.88				$Oracle$: 6.84
BIC	12.07	12.12	12.23	11.86				
CV.1se	2.04	2.04	2.04	2.02	2.04			
CV.min	2.00	2.00	2.02	2.23	2.00	2.01		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**1.98**	2.01	2.75	2.08			2.01	$\rho = 0.9$
AIC	3.16	3.17	3.21	3.02				$Oracle$: 1.80
BIC	3.16	3.17	3.21	2.43				

Table 24: **Predictive MSE for n=100, continuous design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	6.03	5.47	7.37	**3.39**	4.50			
CV.min	3.66	3.54	5.12	3.45	3.45	3.51		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.24	3.93	3.83	3.46			3.86	$\rho = 0$
AIC	3.93	3.94	4.01	3.72				
BIC	3.93	3.94	4.00	3.71				$Oracle$: 2.26
CV.1se	3.71	3.68	3.68	1.86	3.59			
CV.min	2.90	3.04	3.39	1.52	2.83	2.85		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	2.94	3.45	1.54	2.11			2.14	$\rho = 0.5$
AIC	1.51	1.51	1.53	**1.48**				
BIC	1.51	1.51	1.53	1.51				$Oracle$: 0.86
CV.1se	0.76	0.73	0.66	0.55	0.64			
CV.min	0.55	0.55	0.57	0.41	0.54	0.54		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.56	0.68	0.61	0.47			0.56	$\rho = 0.9$
AIC	0.34	0.34	0.34	**0.33**				
BIC	0.34	0.34	0.34	0.55				$Oracle$: 0.19
CV.1se	15.86	15.92	16.11	12.87	15.83			
CV.min	13.74	14.70	15.65	14.59	13.88	13.91		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	13.72	15.18	16.02	**12.39**			15.45	$\rho = 0$
AIC	15.92	16.01	16.18	15.51				
BIC	15.91	16.00	16.18	15.49				$Oracle$: 9.05
CV.1se	6.15	6.15	6.15	5.16	6.14			
CV.min	5.74	5.87	6.06	5.58	5.74	5.75		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.67	6.04	6.02	**5.09**			5.91	$\rho = 0.5$
AIC	6.05	6.07	6.13	5.93				
BIC	6.05	6.07	6.13	5.92				$Oracle$: 3.43
CV.1se	1.38	1.37	1.35	1.20	1.34			
CV.min	1.24	1.24	1.28	**1.13**	1.21	1.21		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.22	1.34	1.32	**1.13**			1.21	$\rho = 0.9$
AIC	1.36	1.37	1.38	1.30				
BIC	1.36	1.36	1.38	1.25				$Oracle$: 0.78
CV.1se	41.10	41.10	41.16	49.82	41.10			
CV.min	41.17	41.36	41.49	59.63	41.39	41.46		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**40.65**	49.38	64.74	43.30			59.90	$\rho = 0$
AIC	64.05	64.49	65.00	63.04				
BIC	64.02	64.47	64.99	63.01				$Oracle$: 36.24
CV.1se	15.53	15.54	15.54	18.34	15.53			
CV.min	15.56	15.59	15.65	21.83	15.63	15.68		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**15.41**	15.84	24.32	16.43			21.33	$\rho = 0.5$
AIC	24.20	24.32	24.53	23.82				
BIC	24.18	24.31	24.52	23.81				$Oracle$: 13.70
CV.1se	3.54	3.54	3.54	3.58	3.54			
CV.min	3.52	3.54	3.55	3.95	3.53	3.54		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**3.49**	3.53	5.40	3.67			3.57	$\rho = 0.9$
AIC	5.47	5.49	5.56	5.28				
BIC	5.46	5.49	5.56	4.57				$Oracle$: 3.12

Table 25: **Predictive MSE for n=100, continuous design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	6.74	6.11	8.34	**3.77**	5.04			
CV.min	4.07	3.93	5.96	3.83	3.85	3.91		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.70	4.30	4.30	3.84			4.30	$\rho = 0$
AIC	4.38	4.39	4.46	4.14				$Oracle$: 2.52
BIC	4.37	4.39	4.46	4.13				
CV.1se	4.12	4.10	4.10	2.07	4.02			
CV.min	3.23	3.39	3.79	1.69	3.19	3.20		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.30	3.84	1.71	2.35			2.40	$\rho = 0.5$
AIC	1.67	1.68	1.70	**1.64**				$Oracle$: 0.95
BIC	1.67	1.68	1.70	1.69				
CV.1se	0.84	0.81	0.74	0.61	0.71			
CV.min	0.61	0.61	0.63	0.46	0.60	0.60		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.62	0.75	0.66	0.51			0.62	$\rho = 0.9$
AIC	0.37	0.37	0.38	**0.36**				$Oracle$: 0.21
BIC	0.37	0.38	0.38	0.59				
CV.1se	17.65	17.73	17.88	14.30	17.57			
CV.min	15.29	16.38	17.43	16.22	15.41	15.43		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	15.27	16.82	17.83	**13.78**			17.13	$\rho = 0$
AIC	17.69	17.80	17.98	17.24				$Oracle$: 10.05
BIC	17.68	17.79	17.98	17.21				
CV.1se	6.83	6.83	6.83	5.74	6.82			
CV.min	6.38	6.54	6.74	6.19	6.38	6.39		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.30	6.72	6.70	**5.66**			6.54	$\rho = 0.5$
AIC	6.71	6.74	6.80	6.59				$Oracle$: 3.80
BIC	6.71	6.73	6.80	6.58				
CV.1se	1.53	1.52	1.50	1.33	1.49			
CV.min	1.37	1.37	1.43	**1.25**	1.35	1.35		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.35	1.49	1.45	**1.25**			1.35	$\rho = 0.9$
AIC	1.50	1.51	1.53	1.44				$Oracle$: 0.86
BIC	1.50	1.51	1.53	1.40				
CV.1se	45.57	45.59	45.62	55.20	45.57			
CV.min	45.65	45.85	45.98	66.11	45.94	46.01		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**45.06**	56.09	71.78	48.00			66.96	$\rho = 0$
AIC	70.97	71.48	72.03	69.85				$Oracle$: 40.18
BIC	70.94	71.46	72.01	69.82				
CV.1se	17.26	17.26	17.27	20.38	17.26			
CV.min	17.28	17.32	17.40	24.29	17.37	17.39		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**17.13**	17.71	27.06	18.28			23.99	$\rho = 0.5$
AIC	26.90	27.05	27.27	26.48				$Oracle$: 15.23
BIC	26.89	27.04	27.27	26.47				
CV.1se	3.90	3.90	3.90	3.96	3.90			
CV.min	3.89	3.90	3.92	4.37	3.90	3.92		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**3.86**	3.90	5.99	4.06			4.01	$\rho = 0.9$
AIC	6.03	6.06	6.14	5.83				$Oracle$: 3.44
BIC	6.03	6.06	6.13	5.05				

Table 26: **Predictive MSE for n=100, continuous design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	7.14	6.46	8.81	**3.97**	5.31			
CV.min	4.29	4.15	6.14	4.04	4.07	4.12		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.01	4.53	4.53	4.04			4.51	$\rho = 0$
AIC	4.62	4.63	4.71	4.36				$Oracle$: 2.65
BIC	4.61	4.62	4.70	4.35				
CV.1se	4.35	4.31	4.32	2.18	4.24			
CV.min	3.40	3.59	4.01	1.78	3.37	3.37		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.48	4.06	1.81	2.47			2.54	$\rho = 0.5$
AIC	1.77	1.77	1.79	**1.73**				$Oracle$: 1.00
BIC	1.77	1.77	1.79	1.79				
CV.1se	0.89	0.85	0.78	0.65	0.75			
CV.min	0.64	0.64	0.67	0.49	0.63	0.63		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.66	0.79	0.69	0.54			0.66	$\rho = 0.9$
AIC	0.39	0.40	0.40	**0.38**				$Oracle$: 0.23
BIC	0.39	0.40	0.40	0.62				
CV.1se	18.66	18.75	18.91	15.12	18.55			
CV.min	16.14	17.34	18.41	17.11	16.33	16.36		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	16.16	17.75	18.84	**14.55**			18.25	$\rho = 0$
AIC	18.68	18.80	18.99	18.21				$Oracle$: 10.62
BIC	18.67	18.79	18.99	18.18				
CV.1se	7.19	7.19	7.19	6.05	7.19			
CV.min	6.72	6.89	7.10	6.52	6.72	6.74		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.63	7.07	7.06	**5.96**			6.89	$\rho = 0.5$
AIC	7.07	7.10	7.17	6.94				$Oracle$: 4.01
BIC	7.07	7.10	7.17	6.93				
CV.1se	1.61	1.60	1.58	1.40	1.56			
CV.min	1.45	1.45	1.50	**1.32**	1.42	1.42		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.42	1.57	1.53	**1.32**			1.43	$\rho = 0.9$
AIC	1.59	1.59	1.61	1.52				$Oracle$: 0.91
BIC	1.58	1.59	1.61	1.47				
CV.1se	48.12	48.15	48.19	58.23	48.13			
CV.min	48.20	48.43	48.57	69.84	48.51	48.58		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**47.6**	59.96	75.78	50.67			70.76	$\rho = 0$
AIC	74.93	75.47	76.04	73.75				$Oracle$: 42.43
BIC	74.89	75.44	76.03	73.72				
CV.1se	18.22	18.22	18.23	21.49	18.22			
CV.min	18.26	18.28	18.35	25.58	18.33	18.34		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**18.08**	18.83	28.56	19.27			24.76	$\rho = 0.5$
AIC	28.38	28.53	28.78	27.94				$Oracle$: 16.07
BIC	28.36	28.52	28.77	27.92				
CV.1se	4.11	4.11	4.11	4.17	4.11			
CV.min	4.10	4.11	4.14	4.61	4.11	4.13		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**4.07**	4.11	6.32	4.28			4.19	$\rho = 0.9$
AIC	6.36	6.39	6.47	6.14				$Oracle$: 3.62
BIC	6.36	6.39	6.47	5.28				

Table 27: **Predictive MSE for n=1000, binary design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	0.34	0.34	0.33	0.33	0.32			
CV.min	0.32	0.32	**0.31**	0.32	**0.31**	0.31		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.32	0.32	**0.31**	0.32			0.31	$\rho = 0$
AIC	0.42	0.42	0.45	0.32				$Oracle$: 0.30
BIC	0.35	0.34	0.32	0.33				
CV.1se	0.31	0.30	0.29	0.30	0.29			
CV.min	0.29	0.29	**0.28**	0.29	**0.28**	0.28		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.29	0.29	**0.28**	0.29			0.28	$\rho = 0.5$
AIC	0.37	0.38	0.40	0.29				$Oracle$: 0.26
BIC	0.32	0.31	0.29	0.30				
CV.1se	0.29	0.29	0.28	0.28	0.27			
CV.min	0.28	0.27	**0.26**	0.27	**0.26**	0.26		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.28	0.27	**0.26**	0.27			0.26	$\rho = 0.9$
AIC	0.35	0.35	0.37	0.27				$Oracle$: 0.25
BIC	0.30	0.29	0.27	0.28				
CV.1se	1.34	1.32	1.29	1.25	1.27			
CV.min	1.26	1.25	**1.23**	1.28	**1.23**	1.23		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.26	1.25	1.27	1.27			1.26	$\rho = 0$
AIC	1.85	1.87	2.00	1.31				$Oracle$: 1.17
BIC	1.35	1.31	1.28	1.27				
CV.1se	1.21	1.18	1.15	1.12	1.13			
CV.min	1.14	1.12	**1.1**	1.15	**1.1**	1.10		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.14	1.12	1.13	1.13			1.13	$\rho = 0.5$
AIC	1.65	1.67	1.78	1.18				$Oracle$: 1.05
BIC	1.22	1.18	1.15	1.14				
CV.1se	1.14	1.12	1.09	1.06	1.07			
CV.min	1.08	1.06	**1.04**	1.08	**1.04**	1.05		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.08	1.06	1.07	1.08			1.07	$\rho = 0.9$
AIC	1.55	1.57	1.68	1.11				$Oracle$: 0.99
BIC	1.16	1.12	1.09	1.09				
CV.1se	5.21	5.16	5.11	4.90	5.07			
CV.min	4.93	**4.89**	4.90	5.20	**4.89**	4.89		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.92	**4.89**	5.17	5.08			4.97	$\rho = 0$
AIC	7.90	8.06	8.55	6.07				$Oracle$: 4.66
BIC	5.13	5.09	5.21	4.95				
CV.1se	4.68	4.62	4.57	4.39	4.53			
CV.min	4.42	4.38	4.38	4.67	**4.37**	**4.38**		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.41	4.38	4.62	4.55			4.47	$\rho = 0.5$
AIC	7.06	7.19	7.62	5.44				$Oracle$: 4.16
BIC	4.62	4.57	4.64	4.46				
CV.1se	4.43	4.38	4.33	4.17	4.28			
CV.min	4.18	4.15	4.16	4.40	**4.14**	**4.15**		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.18	4.15	4.38	4.31			4.23	$\rho = 0.9$
AIC	6.66	6.78	7.20	5.08				$Oracle$: 3.93
BIC	4.39	4.34	4.41	4.23				

Table 28: **Predictive MSE for n=1000, binary design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	2.22	2.18	2.18	2.15	2.10			
CV.min	2.07	2.03	2.05	2.07	**2.01**	2.04		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	2.14	2.06	2.04	2.09			2.04	$\rho = 0$
AIC	2.52	2.56	2.73	2.07				$Oracle$: 1.77
BIC	2.82	2.60	2.38	2.47				
CV.1se	1.99	1.96	1.95	1.95	1.88			
CV.min	1.85	1.82	1.83	1.87	**1.79**	**1.82**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.93	1.85	1.82	1.89			**1.82**	$\rho = 0.5$
AIC	2.25	2.28	2.43	1.87				$Oracle$: 1.57
BIC	2.63	2.38	2.13	2.27				
CV.1se	1.87	1.84	1.83	1.85	1.77			
CV.min	1.75	1.71	1.72	1.77	**1.69**	1.72		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.82	1.75	1.71	1.79			**1.71**	$\rho = 0.9$
AIC	2.11	2.14	2.28	1.77				$Oracle$: 1.48
BIC	2.50	2.27	2.00	2.16				
CV.1se	8.48	8.43	8.71	7.83	8.19			
CV.min	7.81	7.79	8.13	7.85	7.79	7.81		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.91	**7.76**	8.54	7.80			8.32	$\rho = 0$
AIC	10.67	10.91	11.60	8.52				$Oracle$: 6.88
BIC	10.46	9.64	10.63	8.90				
CV.1se	7.64	7.56	7.75	7.05	7.34			
CV.min	7.00	6.96	7.23	7.05	6.98	6.99		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.11	**6.95**	7.54	7.01			7.47	$\rho = 0.5$
AIC	9.49	9.69	10.29	7.65				$Oracle$: 6.11
BIC	9.75	8.86	9.54	8.14				
CV.1se	7.20	7.13	7.36	6.69	6.92			
CV.min	6.61	6.57	6.86	6.67	6.59	6.59		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.72	**6.56**	7.11	6.64			7.05	$\rho = 0.9$
AIC	8.92	9.11	9.68	7.18				$Oracle$: 5.75
BIC	9.29	8.44	9.08	7.77				
CV.1se	30.41	30.51	30.62	28.92	30.45			
CV.min	28.91	29.51	30.38	30.23	28.94	29.01		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**28.81**	29.04	32.33	29.50			29.02	$\rho = 0$
AIC	44.19	45.58	47.69	36.58				$Oracle$: 26.71
BIC	30.59	30.57	30.65	30.31				
CV.1se	27.07	27.11	27.19	25.86	27.08			
CV.min	25.89	26.35	27.03	27.01	25.93	25.96		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**25.77**	25.89	29.02	26.38			25.88	$\rho = 0.5$
AIC	39.26	40.45	42.30	32.78				$Oracle$: 23.69
BIC	27.17	27.16	27.20	26.98				
CV.1se	25.52	25.57	25.62	24.47	25.56			
CV.min	24.45	24.87	25.48	25.45	24.47	24.52		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**24.32**	24.42	27.06	24.91			24.43	$\rho = 0.9$
AIC	36.90	38.04	39.80	30.65				$Oracle$: 22.33
BIC	25.60	25.59	25.63	25.45				

Table 29: **Predictive MSE for n=1000, binary design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	4.93	4.93	5.13	4.95	4.74			
CV.min	4.56	4.55	4.77	4.69	**4.54**	4.56		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.97	4.74	4.69	4.82			4.69	$\rho = 0$
AIC	5.26	5.36	5.71	4.65				$Oracle$: 3.92
BIC	11.76	7.65	5.74	6.80				
CV.1se	4.43	4.41	4.59	4.50	4.26			
CV.min	4.09	**4.06**	4.25	4.25	**4.06**	4.08		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.49	4.27	4.16	4.37			4.16	$\rho = 0.5$
AIC	4.68	4.76	5.06	4.19				$Oracle$: 3.47
BIC	12.00	7.34	5.10	6.48				
CV.1se	4.17	4.16	4.31	4.30	4.00			
CV.min	3.86	**3.83**	3.99	4.04	**3.83**	3.84		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.24	4.03	3.93	4.17			3.93	$\rho = 0.9$
AIC	4.40	4.47	4.76	3.97				$Oracle$: 3.27
BIC	11.64	7.13	4.80	6.31				
CV.1se	18.86	19.46	22.40	17.23	18.29			
CV.min	**16.91**	17.35	20.03	17.04	**16.91**	16.95		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	17.48	17.08	18.88	17.04			17.83	$\rho = 0$
AIC	21.90	22.52	23.77	18.38				$Oracle$: 14.88
BIC	24.64	24.28	24.73	22.96				
CV.1se	17.09	17.59	20.25	15.52	16.55			
CV.min	**15.17**	15.53	18.18	15.31	**15.17**	15.21		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	15.75	15.30	16.73	15.32			16.25	$\rho = 0.5$
AIC	19.43	19.95	21.04	16.45				$Oracle$: 13.17
BIC	21.85	21.67	21.93	20.83				
CV.1se	16.11	16.52	19.24	14.72	15.62			
CV.min	**14.32**	14.64	17.15	14.48	14.33	14.35		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	14.91	14.44	15.77	14.52			15.32	$\rho = 0.9$
AIC	18.27	18.76	19.80	15.47				$Oracle$: 12.42
BIC	20.60	20.48	20.64	19.70				
CV.1se	61.85	61.95	61.96	59.96	61.90			
CV.min	60.09	61.49	61.94	62.57	60.06	60.24		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**59.74**	61.12	64.65	60.97			60.84	$\rho = 0$
AIC	89.79	93.17	96.87	76.06				$Oracle$: 56.30
BIC	61.93	61.94	61.96	61.79				
CV.1se	54.84	54.89	54.90	53.43	54.87			
CV.min	53.63	54.59	54.90	55.72	53.68	53.77		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**53.28**	54.24	57.69	54.35			53.99	$\rho = 0.5$
AIC	79.60	82.49	85.78	67.95				$Oracle$: 49.87
BIC	54.88	54.89	54.90	54.78				
CV.1se	51.68	51.71	51.72	50.51	51.71			
CV.min	50.61	51.47	51.72	52.52	50.62	50.75		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**50.25**	51.16	54.14	51.30			50.95	$\rho = 0.9$
AIC	74.83	77.59	80.74	63.52				$Oracle$: 46.94
BIC	51.70	51.70	51.72	51.63				

Table 30: **Predictive MSE for n=1000, binary design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	11.14	11.67	14.02	11.52	10.67			
CV.min	10.01	10.28	11.57	10.65	**9.96**	10.02		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	12.40	11.26	10.74	11.43			10.74	$\rho = 0$
AIC	10.87	11.12	11.75	10.29				$Oracle$: 8.99
BIC	31.02	30.70	22.48	28.59				
CV.1se	10.11	10.55	13.01	10.54	9.67			
CV.min	8.99	9.22	10.54	9.69	**8.93**	9.00		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	11.39	10.18	9.56	10.45			9.56	$\rho = 0.5$
AIC	9.65	9.86	10.40	9.29				$Oracle$: 7.97
BIC	27.48	27.38	21.35	26.13				
CV.1se	9.46	9.91	12.60	10.08	9.07			
CV.min	8.46	8.67	9.98	9.21	**8.41**	8.47		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	10.75	9.61	9.01	9.99			9.01	$\rho = 0.9$
AIC	9.07	9.27	9.78	8.78				$Oracle$: 7.51
BIC	25.87	25.76	20.43	24.77				
CV.1se	42.32	46.60	49.69	37.25	41.22			
CV.min	36.36	40.66	48.78	36.41	**36.32**	36.42		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	38.68	36.96	40.79	36.80			37.23	$\rho = 0$
AIC	44.46	45.96	48.21	38.73				$Oracle$: 32.78
BIC	49.76	49.76	49.81	49.26				
CV.1se	38.81	42.45	44.07	33.54	38.03			
CV.min	32.89	37.27	43.45	**32.7**	32.83	32.93		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	35.14	33.13	36.23	33.10			33.62	$\rho = 0.5$
AIC	39.44	40.71	42.68	34.60				$Oracle$: 29.03
BIC	44.09	44.08	44.12	43.75				
CV.1se	36.66	39.88	41.48	31.83	36.00			
CV.min	31.09	34.94	40.95	**30.91**	31.05	31.14		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	33.09	31.24	34.04	31.35			31.75	$\rho = 0.9$
AIC	37.06	38.26	40.14	32.51				$Oracle$: 27.37
BIC	41.50	41.50	41.53	41.22				
CV.1se	124.61	124.67	124.67	122.31	124.65			
CV.min	122.59	124.58	124.76	127.56	122.60	122.83		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**121.94**	127.84	127.54	124.38			126.15	$\rho = 0$
AIC	181.11	189.10	195.52	155.43				$Oracle$: 118.96
BIC	124.65	124.67	126.69	124.53				
CV.1se	110.36	110.39	110.40	108.74	110.39			
CV.min	109.04	110.34	110.47	113.45	109.10	109.19		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**108.53**	112.85	113.18	110.60			111.39	$\rho = 0.5$
AIC	160.43	167.29	173.04	138.30				$Oracle$: 105.41
BIC	110.38	110.39	110.77	110.31				
CV.1se	103.91	103.92	103.92	102.63	103.92			
CV.min	102.75	103.86	103.98	106.77	102.85	102.94		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**102.27**	106.26	106.53	104.36			104.97	$\rho = 0.9$
AIC	150.74	157.29	162.82	129.44				$Oracle$: 99.15
BIC	103.90	103.92	104.37	103.84				

Table 31: **Predictive MSE for n=1000, continuous design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	1.38	1.35	1.31	1.32	1.28			
CV.min	1.30	1.28	1.25	1.27	**1.24**	**1.25**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.30	1.28	1.27	1.27			1.27	$\rho = 0$
AIC	1.68	1.69	1.78	1.27				$Oracle$: 1.18
BIC	1.42	1.37	1.32	1.32				
CV.1se	0.56	0.55	0.51	0.61	0.49			
CV.min	0.53	0.51	0.49	0.59	**0.47**	**0.49**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.53	0.52	0.49	0.59			**0.49**	$\rho = 0.5$
AIC	0.61	0.61	0.63	0.59				$Oracle$: 0.45
BIC	0.64	0.60	0.54	0.61				
CV.1se	0.16	0.15	0.14	0.17	0.14			
CV.min	0.15	0.15	0.14	0.17	**0.13**	**0.14**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.15	0.15	0.14	0.17			**0.14**	$\rho = 0.9$
AIC	0.15	0.14	0.14	0.17				$Oracle$: 0.12
BIC	0.20	0.19	0.17	0.17				
CV.1se	5.39	5.29	5.15	5.00	5.10			
CV.min	5.08	5.01	4.95	5.13	**4.94**	**4.95**		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.08	5.02	5.06	5.08			5.05	$\rho = 0$
AIC	7.41	7.50	8.01	5.27				$Oracle$: 4.70
BIC	5.41	5.32	5.32	5.09				
CV.1se	2.19	2.12	2.01	2.08	1.94			
CV.min	2.04	1.99	1.92	2.07	**1.88**	**1.92**		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.04	1.99	1.94	2.06			1.94	$\rho = 0.5$
AIC	2.69	2.72	2.89	2.07				$Oracle$: 1.77
BIC	2.34	2.25	2.12	2.23				
CV.1se	0.64	0.61	0.56	0.54	0.54			
CV.min	0.58	0.57	0.54	**0.52**	0.53	0.54		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58	0.57	0.55	**0.52**			0.57	$\rho = 0.9$
AIC	0.61	0.61	0.65	**0.52**				$Oracle$: 0.48
BIC	0.69	0.68	0.68	0.54				
CV.1se	20.93	20.70	20.51	19.70	20.35			
CV.min	19.78	19.65	19.69	20.92	**19.64**	19.66		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	19.76	19.76	20.60	20.41			19.76	$\rho = 0$
AIC	31.66	32.29	34.25	24.31				$Oracle$: 18.68
BIC	20.61	20.65	21.70	19.92				
CV.1se	8.31	8.18	8.01	7.93	7.74			
CV.min	7.81	7.71	7.65	8.19	**7.48**	7.65		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	7.78	7.73	7.97	8.10			7.78	$\rho = 0.5$
AIC	11.66	11.85	12.62	8.89				$Oracle$: 7.04
BIC	8.21	8.20	8.22	8.11				
CV.1se	2.18	2.17	2.12	2.05	2.15			
CV.min	2.09	2.09	2.08	**2.02**	2.07	2.08		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	2.09	2.09	2.08	2.03			2.08	$\rho = 0.9$
AIC	2.66	2.74	3.05	2.03				$Oracle$: 1.91
BIC	2.10	2.09	2.08	2.07				

Table 32: **Predictive MSE for n=1000, continuous design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	8.89	8.75	8.73	8.62	8.46			
CV.min	8.29	8.15	8.22	8.31	**8.07**	8.19		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	8.58	8.33	8.21	8.36			8.23	$\rho = 0$
AIC	10.11	10.26	10.96	8.32				$Oracle$: 7.12
BIC	11.38	10.69	10.16	9.86				
CV.1se	3.36	3.26	3.14	3.80	3.02			
CV.min	3.10	3.02	2.95	3.53	**2.89**	2.95		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.36	3.18	2.92	3.60			2.91	$\rho = 0.5$
AIC	3.44	3.46	3.65	3.49				$Oracle$: 2.44
BIC	7.68	5.31	3.78	5.59				
CV.1se	0.63	0.61	0.58	1.17	0.56			
CV.min	0.59	0.57	**0.55**	1.10	**0.55**	0.55		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.65	0.61	**0.55**	1.10			0.55	$\rho = 0.9$
AIC	0.59	0.57	0.56	1.10				$Oracle$: 0.44
BIC	1.67	1.66	1.65	1.25				
CV.1se	34.06	33.85	34.98	31.42	32.94			
CV.min	31.34	**31.26**	32.68	31.51	31.30	31.33		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	31.83	31.40	33.52	31.27			31.50	$\rho = 0$
AIC	42.77	43.75	46.49	34.15				$Oracle$: 27.62
BIC	42.03	40.64	48.29	35.76				
CV.1se	13.53	12.89	13.06	12.68	11.78			
CV.min	11.81	11.55	11.96	12.24	**11.26**	11.61		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	12.25	11.78	11.53	12.34			11.74	$\rho = 0.5$
AIC	14.53	14.78	15.67	12.45				$Oracle$: 9.45
BIC	16.62	16.65	16.79	16.24				
CV.1se	2.91	2.78	2.71	2.50	2.29			
CV.min	2.64	2.45	2.48	2.35	**2.15**	2.39		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.67	2.67	2.62	2.35			2.56	$\rho = 0.9$
AIC	2.29	2.32	2.52	2.34				$Oracle$: 1.72
BIC	2.84	2.84	2.82	2.79				
CV.1se	122.32	122.70	123.15	116.28	122.44			
CV.min	116.26	118.42	122.17	121.45	116.33	116.64		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**115.83**	118.96	123.27	118.51			115.82	$\rho = 0$
AIC	177.17	182.78	191.21	146.86				$Oracle$: 107.15
BIC	123.05	123.19	123.26	121.93				
CV.1se	42.16	42.17	42.17	41.75	42.16			
CV.min	41.82	41.91	42.11	43.03	41.82	41.85		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**41.56**	42.03	42.18	42.51			41.59	$\rho = 0.5$
AIC	60.25	61.81	64.90	50.74				$Oracle$: 36.65
BIC	42.13	42.15	42.17	42.06				
CV.1se	7.70	7.69	7.67	7.60	7.70			
CV.min	7.50	7.49	7.47	7.50	**7.46**	7.47		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	7.49	7.51	7.49	7.52			7.48	$\rho = 0.9$
AIC	9.77	10.11	11.15	7.60				$Oracle$: 6.68
BIC	7.53	7.54	7.54	7.48				

Table 33: **Predictive MSE for n=1000, continuous design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	19.75	19.76	20.62	19.85	19.04			
CV.min	18.30	18.24	19.12	18.83	**18.2**	18.27		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	19.91	19.17	18.81	19.30			18.89	$\rho = 0$
AIC	21.09	21.49	22.88	18.63				$Oracle$: 15.73
BIC	46.55	33.24	24.57	27.18				
CV.1se	7.50	7.32	7.19	9.12	7.09			
CV.min	6.74	**6.63**	6.69	8.03	6.70	6.65		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	8.11	7.40	6.65	8.66			6.65	$\rho = 0.5$
AIC	7.16	7.24	7.62	7.58				$Oracle$: 5.31
BIC	20.78	20.81	17.61	20.27				
CV.1se	1.32	1.28	1.23	2.70	1.26			
CV.min	1.18	1.16	1.15	2.39	1.19	**1.15**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.51	1.32	1.16	2.40			1.16	$\rho = 0.9$
AIC	1.18	**1.14**	1.15	2.36				$Oracle$: 0.90
BIC	3.33	3.33	3.31	3.28				
CV.1se	75.68	78.22	89.56	69.05	73.29			
CV.min	**67.78**	69.59	80.16	68.33	67.80	67.97		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	70.19	69.24	77.65	68.32			69.41	$\rho = 0$
AIC	87.75	90.22	95.25	73.65				$Oracle$: 59.71
BIC	98.91	98.92	99.42	91.76				
CV.1se	32.61	32.35	33.50	27.99	31.66			
CV.min	27.83	28.32	32.85	26.47	27.79	27.43		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	28.71	27.60	27.00	27.01			27.97	$\rho = 0.5$
AIC	29.61	30.23	31.88	**26.46**				$Oracle$: 20.16
BIC	33.51	33.54	33.58	33.30				
CV.1se	5.69	5.68	5.64	5.37	5.66			
CV.min	5.46	5.44	5.46	4.96	5.37	5.43		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.41	5.49	5.47	4.92			5.42	$\rho = 0.9$
AIC	**4.51**	4.59	5.00	4.75				$Oracle$: 3.43
BIC	5.51	5.51	5.48	5.47				
CV.1se	248.48	248.75	248.83	240.83	248.64			
CV.min	241.25	246.89	248.80	251.00	241.20	241.96		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**239.87**	247.57	248.98	244.78			239.94	$\rho = 0$
AIC	359.81	373.33	388.16	305.32				$Oracle$: 225.74
BIC	248.75	248.83	260.38	248.16				
CV.1se	84.04	84.04	84.04	83.70	84.04			
CV.min	83.75	83.95	84.07	86.35	83.78	83.79		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**83.45**	84.01	84.08	85.29			83.43	$\rho = 0.5$
AIC	120.66	124.51	130.20	103.48				$Oracle$: 76.23
BIC	84.03	84.04	84.04	83.99				
CV.1se	14.33	14.33	14.33	14.29	14.34			
CV.min	14.17	14.16	14.17	14.21	14.15	**14.15**		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**14.13**	14.20	14.25	14.25			14.14	$\rho = 0.9$
AIC	18.82	19.62	21.33	14.53				$Oracle$: 12.97
BIC	14.23	14.25	14.31	14.17				

Table 34: **Predictive MSE for n=1000, continuous design, dense covariates, and decay 200**.

	lasso	GL $\gamma=1$	GL $\gamma=10$	AL	MCP	CVbest	ICbest	
CV.1se	44.42	46.71	56.79	46.06	42.76			
CV.min	40.06	41.17	46.59	42.63	**39.87**	40.10		$\mathrm{sd}(\mu)/\sigma=2$
AICc	49.74	45.58	43.24	45.76			44.27	$\rho=0$
AIC	43.49	44.52	47.03	41.20				$Oracle$: 36.05
BIC	124.28	124.46	72.81	114.38				
CV.1se	20.11	21.43	39.27	23.34	19.23			
CV.min	15.20	15.65	34.29	19.50	15.17	15.14		$\mathrm{sd}(\mu)/\sigma=2$
AICc	26.86	19.33	15.30	22.13			15.30	$\rho=0.5$
AIC	**14.76**	14.97	15.68	16.30				$Oracle$: 12.09
BIC	41.76	41.80	41.06	41.46				
CV.1se	5.61	5.64	6.78	6.32	6.14			
CV.min	4.01	4.16	6.49	5.32	4.91	3.73		$\mathrm{sd}(\mu)/\sigma=2$
AICc	6.40	6.11	2.57	5.28			2.57	$\rho=0.9$
AIC	2.40	**2.37**	2.43	4.53				$Oracle$: 1.98
BIC	6.66	6.66	6.64	6.60				
CV.1se	169.30	187.88	199.29	149.02	165.35			
CV.min	**145.46**	163.65	195.22	145.76	145.47	145.65		$\mathrm{sd}(\mu)/\sigma=1$
AICc	155.35	149.68	176.34	147.26			151.51	$\rho=0$
AIC	178.00	184.00	193.01	154.99				$Oracle$: 131.43
BIC	199.52	199.72	199.19	197.28				
CV.1se	66.93	67.00	67.02	59.80	66.97			
CV.min	64.04	65.70	66.87	55.90	63.97	64.09		$\mathrm{sd}(\mu)/\sigma=1$
AICc	63.18	65.26	63.30	57.33			63.14	$\rho=0.5$
AIC	59.68	61.25	64.28	**54.73**				$Oracle$: 44.09
BIC	66.99	67.02	67.02	66.86				
CV.1se	11.00	11.00	10.99	10.89	11.01			
CV.min	10.74	10.74	10.76	10.35	10.73	10.72		$\mathrm{sd}(\mu)/\sigma=1$
AICc	10.65	10.82	10.84	10.27			10.65	$\rho=0.9$
AIC	**9.05**	9.31	10.04	9.44				$Oracle$: 7.22
BIC	10.86	10.87	10.92	10.78				
CV.1se	499.75	499.92	499.94	490.79	499.87			
CV.min	491.34	499.45	500.31	511.49	491.87	492.40		$\mathrm{sd}(\mu)/\sigma=0.5$
AICc	**488.97**	501.61	499.93	498.68			488.93	$\rho=0$
AIC	725.13	757.08	782.66	623.41				$Oracle$: 476.83
BIC	499.85	499.93	702.82	499.40				
CV.1se	167.73	167.73	167.73	167.37	167.73			
CV.min	167.35	167.70	167.82	172.56	167.40	167.48		$\mathrm{sd}(\mu)/\sigma=0.5$
AICc	**166.89**	167.74	167.73	170.57			166.89	$\rho=0.5$
AIC	241.13	250.55	260.98	208.44				$Oracle$: 159.94
BIC	167.72	167.73	169.58	167.68				
CV.1se	27.55	27.55	27.55	27.53	27.55			
CV.min	27.44	27.45	27.50	27.54	27.44	**27.44**		$\mathrm{sd}(\mu)/\sigma=0.5$
AICc	**27.39**	27.50	27.54	27.60			27.39	$\rho=0.9$
AIC	36.95	38.80	41.67	28.31				$Oracle$: 26.20
BIC	27.52	27.53	27.55	27.47				

Table 35: **Predictive MSE for n=1000, binary design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	0.34	0.34	0.33	0.33	0.32			
CV.min	0.32	0.32	**0.31**	0.32	**0.31**	0.31		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.32	0.32	**0.31**	0.32			0.31	$\rho = 0$
AIC	0.42	0.42	0.45	0.32				$Oracle$: **0.31**
BIC	0.35	0.34	0.32	0.33				
CV.1se	0.31	0.30	0.29	0.30	0.29			
CV.min	0.29	0.29	**0.28**	0.29	**0.28**	0.28		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.29	0.29	**0.28**	0.29			0.28	$\rho = 0.5$
AIC	0.37	0.38	0.40	0.29				$Oracle$: **0.28**
BIC	0.32	0.31	0.29	0.30				
CV.1se	0.29	0.29	0.28	0.28	0.27			
CV.min	0.28	0.27	**0.26**	0.27	**0.26**	0.26		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.28	0.27	**0.26**	0.27			0.26	$\rho = 0.9$
AIC	0.35	0.35	0.37	0.27				$Oracle$: **0.26**
BIC	0.30	0.29	0.27	0.28				
CV.1se	1.34	1.32	1.29	1.25	1.27			
CV.min	1.26	1.25	**1.23**	1.28	**1.23**	1.23		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.26	1.25	1.27	1.27			1.27	$\rho = 0$
AIC	1.85	1.87	2.00	1.31				$Oracle$: 1.24
BIC	1.35	1.31	1.29	1.27				
CV.1se	1.21	1.18	1.15	1.12	1.13			
CV.min	1.14	1.12	**1.1**	1.15	**1.1**	1.10		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.14	1.12	1.13	1.14			1.13	$\rho = 0.5$
AIC	1.65	1.67	1.78	1.18				$Oracle$: 1.11
BIC	1.22	1.18	1.15	1.14				
CV.1se	1.14	1.12	1.09	1.06	1.07			
CV.min	1.08	1.06	**1.04**	1.08	**1.04**	1.05		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.08	1.06	1.07	1.08			1.07	$\rho = 0.9$
AIC	1.55	1.57	1.68	1.11				$Oracle$: 1.05
BIC	1.16	1.12	1.09	1.09				
CV.1se	5.21	5.16	5.11	4.90	5.07			
CV.min	4.93	**4.89**	4.90	5.20	**4.89**	4.90		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.92	**4.89**	5.17	5.08			4.97	$\rho = 0$
AIC	7.90	8.06	8.55	6.07				$Oracle$: 4.98
BIC	5.14	5.09	5.21	4.96				
CV.1se	4.68	4.62	4.56	4.39	4.53			
CV.min	4.42	4.38	4.38	4.67	**4.37**	4.37		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.41	4.38	4.62	4.55			4.46	$\rho = 0.5$
AIC	7.06	7.19	7.62	5.44				$Oracle$: 4.44
BIC	4.62	4.57	4.64	4.46				
CV.1se	4.43	4.38	4.33	4.17	4.28			
CV.min	4.18	4.15	4.16	4.40	**4.13**	**4.15**		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.18	4.15	4.38	4.31			4.23	$\rho = 0.9$
AIC	6.65	6.78	7.20	5.08				$Oracle$: 4.20
BIC	4.39	4.34	4.40	4.23				

Table 36: **Predictive MSE for n=1000, binary design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	2.11	2.06	2.02	2.04	1.97			
CV.min	1.98	1.93	1.91	1.97	**1.89**	**1.91**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	2.03	1.95	1.93	1.98			1.93	$\rho = 0$
AIC	2.47	2.50	2.68	1.98				$Oracle$: 1.66
BIC	2.59	2.38	2.18	2.29				
CV.1se	1.90	1.85	1.81	1.85	1.76			
CV.min	1.78	1.73	1.71	1.78	**1.69**	**1.71**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.83	1.76	1.71	1.79			1.72	$\rho = 0.5$
AIC	2.20	2.23	2.38	1.79				$Oracle$: 1.47
BIC	2.40	2.19	1.95	2.12				
CV.1se	1.79	1.74	1.70	1.76	1.65			
CV.min	1.68	1.64	1.61	1.69	**1.59**	1.62		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.73	1.66	1.62	1.70			1.62	$\rho = 0.9$
AIC	2.07	2.09	2.23	1.69				$Oracle$: 1.38
BIC	2.28	2.08	1.84	2.02				
CV.1se	8.24	8.17	8.39	7.62	7.95			
CV.min	7.60	7.57	7.86	7.64	7.58	7.60		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.69	**7.54**	8.30	7.58			8.08	$\rho = 0$
AIC	10.46	10.70	11.38	8.30				$Oracle$: 6.62
BIC	10.06	9.29	10.18	8.59				
CV.1se	7.42	7.33	7.47	6.86	7.11			
CV.min	6.82	6.77	6.99	6.87	6.78	6.79		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.92	**6.76**	7.35	6.82			7.26	$\rho = 0.5$
AIC	9.31	9.51	10.10	7.46				$Oracle$: 5.88
BIC	9.38	8.53	9.14	7.86				
CV.1se	6.99	6.92	7.11	6.51	6.71			
CV.min	6.44	6.39	6.65	6.49	6.40	6.41		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.54	**6.38**	6.88	6.46			6.83	$\rho = 0.9$
AIC	8.75	8.94	9.50	7.00				$Oracle$: 5.54
BIC	8.98	8.13	8.69	7.50				
CV.1se	29.81	29.91	30.03	28.31	29.84			
CV.min	28.31	28.88	29.78	29.60	28.34	28.39		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**28.2**	28.41	31.56	28.90			28.40	$\rho = 0$
AIC	43.35	44.71	46.79	35.84				$Oracle$: 26.48
BIC	30.01	29.97	30.07	29.69				
CV.1se	26.57	26.62	26.70	25.36	26.60			
CV.min	25.38	25.82	26.53	26.50	25.42	25.44		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**25.25**	25.38	28.50	25.87			25.38	$\rho = 0.5$
AIC	38.55	39.72	41.54	32.20				$Oracle$: 23.53
BIC	26.68	26.67	26.72	26.49				
CV.1se	25.05	25.11	25.16	23.99	25.10			
CV.min	23.95	24.36	25.01	24.95	23.99	24.03		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**23.85**	23.94	26.63	24.43			**23.94**	$\rho = 0.9$
AIC	36.24	37.35	39.09	30.06				$Oracle$: 22.16
BIC	25.15	25.13	25.18	24.98				

Table 37: **Predictive MSE for n=1000, binary design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	3.76	3.61	3.36	3.65	3.30			
CV.min	3.56	3.43	**3.26**	3.53	**3.26**	3.28		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.67	3.47	3.35	3.55			3.36	$\rho = 0$
AIC	4.47	4.55	4.87	3.57				$Oracle$: 2.94
BIC	4.59	4.06	3.62	4.07				
CV.1se	3.38	3.23	2.98	3.31	2.91			
CV.min	3.20	3.08	2.90	3.20	**2.88**	2.90		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.30	3.11	2.98	3.23			2.98	$\rho = 0.5$
AIC	3.98	4.05	4.32	3.23				$Oracle$: 2.61
BIC	4.23	3.69	3.20	3.78				
CV.1se	3.18	3.04	2.83	3.16	2.76			
CV.min	3.02	2.91	2.75	3.04	**2.72**	2.76		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.12	2.94	2.81	3.07			2.81	$\rho = 0.9$
AIC	3.74	3.81	4.07	3.06				$Oracle$: 2.46
BIC	4.04	3.51	3.04	3.63				
CV.1se	15.29	15.35	16.83	14.13	14.78			
CV.min	13.96	14.04	15.26	14.06	**13.95**	13.98		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	14.24	13.96	15.45	14.00			14.51	$\rho = 0$
AIC	18.83	19.34	20.48	15.33				$Oracle$: 11.78
BIC	21.17	19.98	21.18	17.90				
CV.1se	13.82	13.84	15.21	12.77	13.33			
CV.min	12.54	12.58	13.66	12.68	12.53	12.54		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	12.85	**12.52**	13.71	12.65			13.25	$\rho = 0.5$
AIC	16.74	17.18	18.16	13.77				$Oracle$: 10.46
BIC	18.86	18.33	18.89	16.72				
CV.1se	13.02	13.04	14.46	12.13	12.59			
CV.min	11.84	11.86	13.02	12.00	11.83	**11.83**		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	12.15	**11.82**	12.94	11.98			12.53	$\rho = 0.9$
AIC	15.75	16.16	17.10	12.95				$Oracle$: 9.86
BIC	17.80	17.37	17.79	16.04				
CV.1se	53.36	53.48	53.51	51.35	53.41			
CV.min	51.39	52.79	53.45	53.56	51.43	51.55		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**51.14**	52.09	55.86	52.29			51.95	$\rho = 0$
AIC	77.50	80.32	83.64	65.12				$Oracle$: 47.14
BIC	53.49	53.50	53.52	53.31				
CV.1se	47.42	47.49	47.51	45.88	47.46			
CV.min	46.02	46.99	47.48	47.86	46.06	46.14		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**45.75**	46.41	50.02	46.73			46.29	$\rho = 0.5$
AIC	68.81	71.22	74.17	58.32				$Oracle$: 41.82
BIC	47.49	47.49	47.51	47.37				
CV.1se	44.74	44.79	44.80	43.44	44.78			
CV.min	43.47	44.38	44.80	45.16	43.50	43.59		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**43.18**	43.79	46.92	44.14			43.66	$\rho = 0.9$
AIC	64.73	67.04	69.87	54.55				$Oracle$: 39.43
BIC	44.79	44.79	44.81	44.69				

Table 38: **Predictive MSE for n=1000, binary design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	5.50	5.19	4.63	5.29	4.56			
CV.min	5.24	4.99	4.60	5.13	**4.55**	4.60		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.39	5.03	4.76	5.16			4.75	$\rho = 0$
AIC	6.62	6.76	7.25	5.24				$Oracle$: 4.33
BIC	6.47	5.65	4.98	5.74				
CV.1se	4.93	4.64	4.09	4.81	4.01			
CV.min	4.70	4.46	4.08	4.66	**4**	4.08		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.85	4.51	4.20	4.69			4.20	$\rho = 0.5$
AIC	5.89	6.00	6.43	4.73				$Oracle$: 3.84
BIC	5.94	5.10	4.38	5.31				
CV.1se	4.65	4.38	3.88	4.59	3.81			
CV.min	4.44	4.22	3.88	4.43	**3.78**	3.88		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.59	4.26	3.97	4.46			3.98	$\rho = 0.9$
AIC	5.54	5.65	6.05	4.49				$Oracle$: 3.62
BIC	5.65	4.82	4.15	5.08				
CV.1se	22.82	23.17	26.71	21.08	22.03			
CV.min	**20.74**	21.00	23.69	20.92	**20.74**	20.79		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	21.25	20.81	23.26	20.86			21.08	$\rho = 0$
AIC	27.81	28.66	30.26	22.86				$Oracle$: 17.32
BIC	31.33	30.68	31.31	28.86				
CV.1se	20.66	20.93	24.44	19.07	19.93			
CV.min	**18.64**	18.82	21.57	18.87	**18.64**	18.66		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	19.17	18.65	20.58	18.86			19.17	$\rho = 0.5$
AIC	24.70	25.42	26.82	20.50				$Oracle$: 15.36
BIC	27.83	27.60	27.86	26.46				
CV.1se	19.48	19.76	23.30	18.14	18.83			
CV.min	17.62	17.78	20.53	17.88	**17.61**	**17.62**		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	18.13	17.63	19.45	17.89			18.14	$\rho = 0.9$
AIC	23.26	23.95	25.28	19.30				$Oracle$: 14.49
BIC	26.26	26.12	26.29	25.22				
CV.1se	78.47	78.59	78.62	75.90	78.53			
CV.min	76.00	78.08	78.62	79.15	76.01	76.19		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**75.6**	77.89	81.00	77.21			77.52	$\rho = 0$
AIC	114.01	118.59	123.13	96.44				$Oracle$: 69.25
BIC	78.59	78.61	78.62	78.42				
CV.1se	69.71	69.78	69.79	67.79	69.75			
CV.min	68.02	69.44	69.81	70.68	68.07	68.17		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**67.61**	69.22	72.36	68.97			68.86	$\rho = 0.5$
AIC	101.21	105.15	109.20	86.21				$Oracle$: 61.43
BIC	69.77	69.78	69.79	69.65				
CV.1se	65.81	65.86	65.86	64.21	65.85			
CV.min	64.32	65.58	65.89	66.75	64.36	64.49		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**63.9**	65.37	68.08	65.23			65.06	$\rho = 0.9$
AIC	95.28	99.04	102.94	80.65				$Oracle$: 57.96
BIC	65.85	65.85	65.86	65.75				

Table 39: **Predictive MSE for n=1000, continuous design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	1.38	1.35	1.31	1.32	1.28			
CV.min	1.30	1.28	1.25	1.27	**1.24**	**1.25**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.30	1.28	1.27	1.27			1.27	$\rho = 0$
AIC	1.68	1.69	1.79	1.27				$Oracle$: 1.25
BIC	1.42	1.37	1.32	1.32				
CV.1se	0.56	0.55	0.51	0.61	0.49			
CV.min	0.53	0.51	0.49	0.59	**0.47**	**0.49**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.53	0.52	0.49	0.59			**0.49**	$\rho = 0.5$
AIC	0.61	0.61	0.63	0.59				$Oracle$: **0.47**
BIC	0.64	0.60	0.54	0.61				
CV.1se	0.16	0.15	0.14	0.17	0.14			
CV.min	0.15	0.15	0.14	0.17	**0.13**	**0.14**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.15	0.15	0.14	0.17			**0.14**	$\rho = 0.9$
AIC	0.15	0.14	0.14	0.17				$Oracle$: **0.13**
BIC	0.20	0.19	0.17	0.17				
CV.1se	5.39	5.29	5.15	5.00	5.10			
CV.min	5.08	5.01	4.95	5.13	**4.94**	**4.95**		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.08	5.02	5.06	5.08			5.05	$\rho = 0$
AIC	7.41	7.50	8.01	5.27				$Oracle$: 4.99
BIC	5.42	5.32	5.32	5.09				
CV.1se	2.19	2.12	2.01	2.08	1.94			
CV.min	2.04	1.99	1.92	2.07	**1.88**	**1.92**		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.04	1.99	1.94	2.06			1.94	$\rho = 0.5$
AIC	2.69	2.72	2.89	2.07				$Oracle$: **1.88**
BIC	2.34	2.25	2.12	2.23				
CV.1se	0.64	0.61	0.56	0.54	0.54			
CV.min	0.58	0.57	0.54	**0.52**	0.53	0.54		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58	0.57	0.55	**0.52**			0.57	$\rho = 0.9$
AIC	0.61	0.61	0.65	**0.52**				$Oracle$: 0.51
BIC	0.69	0.68	0.68	0.54				
CV.1se	20.93	20.70	20.50	19.70	20.35			
CV.min	19.78	19.65	19.69	20.92	**19.64**	19.66		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	19.76	19.76	20.60	20.41			19.76	$\rho = 0$
AIC	31.66	32.29	34.25	24.31				$Oracle$: 19.97
BIC	20.61	20.65	21.70	19.91				
CV.1se	8.31	8.18	8.01	7.93	7.74			
CV.min	7.82	7.71	7.66	8.19	**7.48**	7.65		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	7.78	7.74	7.98	8.10			7.78	$\rho = 0.5$
AIC	11.66	11.85	12.62	8.89				$Oracle$: 7.53
BIC	8.22	8.21	8.22	8.12				
CV.1se	2.18	2.17	2.12	2.05	2.15			
CV.min	2.09	2.09	2.08	**2.02**	2.07	2.08		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	2.09	2.09	2.08	2.03			2.08	$\rho = 0.9$
AIC	2.66	2.74	3.05	2.03				$Oracle$: 2.04
BIC	2.10	2.09	2.08	2.07				

Table 40: **Predictive MSE for n=1000, continuous design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	8.47	8.27	8.11	8.19	7.90			
CV.min	7.94	7.76	7.67	7.92	**7.61**	7.69		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	8.15	7.88	7.74	7.95			7.76	$\rho = 0$
AIC	9.89	10.03	10.73	7.94				$Oracle$: 6.65
BIC	10.42	9.81	9.31	9.16				
CV.1se	3.20	3.09	2.93	3.63	2.81			
CV.min	2.98	2.89	2.78	3.38	**2.71**	2.78		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.18	3.01	2.76	3.44			**2.76**	$\rho = 0.5$
AIC	3.35	3.38	3.57	3.36				$Oracle$: 2.28
BIC	6.83	4.77	3.50	5.19				
CV.1se	0.61	0.59	0.55	1.14	0.53			
CV.min	0.57	0.55	0.53	1.08	**0.52**	**0.53**		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.62	0.58	0.53	1.08			**0.53**	$\rho = 0.9$
AIC	0.57	0.55	0.54	1.08				$Oracle$: 0.42
BIC	1.64	1.64	1.59	1.21				
CV.1se	33.07	32.79	33.77	30.55	31.94			
CV.min	30.50	**30.37**	31.59	30.66	30.41	30.47		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	30.93	30.49	32.44	30.41			30.59	$\rho = 0$
AIC	41.93	42.89	45.60	33.25				$Oracle$: 26.59
BIC	40.50	39.02	47.09	34.53				
CV.1se	13.10	12.48	12.58	12.37	11.41			
CV.min	11.51	11.24	11.59	11.95	**10.93**	11.30		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	11.92	11.46	11.22	12.03			11.40	$\rho = 0.5$
AIC	14.26	14.50	15.38	12.16				$Oracle$: 9.11
BIC	16.31	16.34	16.49	15.92				
CV.1se	2.86	2.70	2.63	2.46	2.21			
CV.min	2.56	2.37	2.38	2.31	**2.09**	2.31		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.60	2.59	2.53	2.31			2.48	$\rho = 0.9$
AIC	2.26	2.28	2.48	2.30				$Oracle$: 1.68
BIC	2.80	2.80	2.78	2.75				
CV.1se	119.93	120.31	120.82	113.86	120.03			
CV.min	113.81	115.93	119.70	118.93	113.89	114.14		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**113.42**	116.46	120.93	116.06			113.39	$\rho = 0$
AIC	173.78	179.27	187.58	144.00				$Oracle$: 106.35
BIC	120.69	120.84	120.92	119.52				
CV.1se	41.42	41.42	41.42	40.99	41.42			
CV.min	41.07	41.14	41.36	42.25	41.06	41.08		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**40.82**	41.28	41.44	41.71			40.82	$\rho = 0.5$
AIC	59.16	60.69	63.73	49.77				$Oracle$: 36.43
BIC	41.38	41.40	41.42	41.31				
CV.1se	7.60	7.59	7.57	7.50	7.60			
CV.min	7.40	7.39	7.37	7.40	**7.36**	7.37		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	7.39	7.41	7.39	7.42			7.38	$\rho = 0.9$
AIC	9.64	9.97	11.00	7.50				$Oracle$: 6.70
BIC	7.43	7.44	7.43	7.38				

Table 41: **Predictive MSE for n=1000, continuous design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	15.10	14.47	13.52	14.64	13.24			
CV.min	14.30	13.80	**13.11**	14.18	13.12	13.17		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	14.72	14.01	13.45	14.25			13.53	$\rho = 0$
AIC	17.93	18.24	19.55	14.33				$Oracle$: 11.82
BIC	18.30	16.69	14.97	16.28				
CV.1se	5.57	5.26	4.71	6.67	4.41			
CV.min	5.32	5.06	4.65	6.10	**4.39**	4.65		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.67	5.23	4.64	6.35			4.64	$\rho = 0.5$
AIC	6.07	6.12	6.49	5.98				$Oracle$: 4.01
BIC	17.96	17.51	5.13	16.69				
CV.1se	1.01	0.96	0.86	2.24	0.82			
CV.min	0.97	0.92	0.85	2.01	**0.81**	0.85		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.06	0.97	0.85	2.02			0.85	$\rho = 0.9$
AIC	0.96	0.93	0.94	2.01				$Oracle$: 0.70
BIC	2.91	2.92	2.88	2.82				
CV.1se	61.30	61.63	67.80	56.69	59.40			
CV.min	**56.03**	56.36	61.20	56.45	56.05	56.08		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	57.25	56.51	61.22	56.21			56.57	$\rho = 0$
AIC	75.47	77.53	82.05	61.51				$Oracle$: 47.30
BIC	85.09	84.04	85.85	71.78				
CV.1se	26.22	25.20	28.27	23.25	23.48			
CV.min	21.83	21.47	26.06	22.17	**21.11**	21.36		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	22.98	21.55	21.26	22.50			21.78	$\rho = 0.5$
AIC	25.54	26.06	27.54	22.37				$Oracle$: 16.04
BIC	29.05	29.08	29.14	28.80				
CV.1se	5.02	4.99	4.96	4.61	4.79			
CV.min	4.76	4.68	4.79	4.25	4.36	4.69		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	4.74	4.81	4.76	4.23			4.70	$\rho = 0.9$
AIC	**3.92**	3.98	4.36	4.11				$Oracle$: 2.80
BIC	4.86	4.86	4.83	4.81				
CV.1se	214.42	214.86	215.02	206.23	214.59			
CV.min	206.43	212.06	214.78	214.96	206.33	207.05		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**205.31**	212.39	215.21	209.69			205.37	$\rho = 0$
AIC	310.41	321.76	335.07	261.14				$Oracle$: 189.14
BIC	214.89	215.00	217.26	214.16				
CV.1se	72.92	72.92	72.92	72.56	72.92			
CV.min	72.61	72.80	72.95	74.88	72.64	72.66		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**72.32**	72.89	72.96	73.92			72.31	$\rho = 0.5$
AIC	104.61	107.80	112.84	89.35				$Oracle$: 64.15
BIC	72.91	72.92	72.92	72.88				
CV.1se	12.72	12.72	12.71	12.66	12.72			
CV.min	12.53	12.53	12.53	12.57	12.51	**12.51**		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**12.5**	12.58	12.60	12.60			12.50	$\rho = 0.9$
AIC	16.60	17.27	18.84	12.81				$Oracle$: 11.20
BIC	12.61	12.62	12.69	12.54				

Table 42: **Predictive MSE for n=1000, continuous design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	AL	MCP	CVbest	ICbest	
CV.1se	22.06	20.83	18.60	21.21	18.31			
CV.min	21.02	20.04	18.49	20.59	**18.26**	18.51		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	21.63	20.28	19.18	20.69			19.29	$\rho = 0$
AIC	26.52	27.07	29.04	21.02				$Oracle$: 17.37
BIC	26.07	23.17	20.23	23.08				
CV.1se	8.07	7.45	6.44	9.77	**6.03**			
CV.min	7.79	7.30	6.54	8.91	6.04	6.54		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	8.27	7.47	6.47	9.35			6.48	$\rho = 0.5$
AIC	8.98	9.08	9.65	8.69				$Oracle$: 5.87
BIC	26.50	25.09	6.71	25.92				
CV.1se	1.44	1.33	1.17	3.34	**1.09**			
CV.min	1.39	1.31	1.18	2.88	1.10	1.19		$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.51	1.35	1.16	2.90			1.16	$\rho = 0.9$
AIC	1.39	1.34	1.41	2.84				$Oracle$: 1.01
BIC	4.27	4.28	3.44	4.21				
CV.1se	91.40	92.90	107.18	84.53	88.38			
CV.min	83.20	84.26	95.00	83.92	**83.19**	83.31		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	85.14	84.21	93.73	83.70			84.23	$\rho = 0$
AIC	111.39	114.82	121.21	91.72				$Oracle$: 69.47
BIC	125.83	125.78	126.15	116.17				
CV.1se	40.67	40.08	42.55	34.99	39.34			
CV.min	34.02	34.26	41.87	33.17	33.76	33.38		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	35.81	32.73	**32.27**	33.80			33.55	$\rho = 0.5$
AIC	37.63	38.50	40.63	33.23				$Oracle$: 23.49
BIC	42.62	42.64	42.67	42.42				
CV.1se	7.28	7.27	7.23	6.96	7.25			
CV.min	6.96	6.94	6.98	6.41	6.89	6.93		$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.90	7.03	7.00	6.35			6.89	$\rho = 0.9$
AIC	**5.77**	5.89	6.45	5.97				$Oracle$: 4.03
BIC	7.09	7.11	7.11	7.01				
CV.1se	315.28	315.72	315.85	304.89	315.47			
CV.min	305.33	313.63	315.86	317.57	305.18	306.22		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**303.58**	314.44	315.81	309.81			303.59	$\rho = 0$
AIC	456.70	475.12	493.35	386.66				$Oracle$: 277.88
BIC	315.72	315.81	351.65	314.97				
CV.1se	106.78	106.79	106.78	106.40	106.79			
CV.min	106.43	106.70	106.84	109.83	106.46	106.57		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**106.08**	106.77	106.79	108.39			106.12	$\rho = 0.5$
AIC	153.36	158.62	165.71	131.58				$Oracle$: 93.96
BIC	106.77	106.78	106.79	106.75				
CV.1se	18.33	18.33	18.32	18.28	18.33			
CV.min	18.14	18.15	18.20	18.18	18.14	**18.14**		$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**18.1**	18.22	18.29	18.23			18.10	$\rho = 0.9$
AIC	24.24	25.34	27.45	18.64				$Oracle$: 16.13
BIC	18.25	18.28	18.32	18.18				

Table 43: **Estimation MSE for n=100, binary design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.99	0.94	1.06	0.53	0.87	
CV.min	0.59	0.63	0.84	**0.51**	0.62	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.72	0.67	0.54	0.56		$\rho = 0$
AIC	0.55	0.55	0.56	0.52		$Oracle$: 0.37
BIC	0.55	0.55	0.56	0.53		
CV.1se	0.97	0.92	0.99	0.49	0.83	
CV.min	0.58	0.60	0.79	**0.46**	0.59	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.69	0.64	0.48	0.52		$\rho = 0.5$
AIC	0.49	0.49	0.50	0.47		$Oracle$: 0.33
BIC	0.49	0.49	0.50	0.48		
CV.1se	0.93	0.89	0.96	0.47	0.80	
CV.min	0.56	0.59	0.78	**0.44**	0.58	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.67	0.63	0.46	0.50		$\rho = 0.9$
AIC	0.46	0.47	0.47	0.45		$Oracle$: 0.31
BIC	0.46	0.47	0.47	0.46		
CV.1se	2.18	2.18	2.20	1.79	2.17	
CV.min	1.91	2.00	2.13	2.03	1.93	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.91	1.92	2.21	**1.73**		$\rho = 0$
AIC	2.21	2.22	2.24	2.15		$Oracle$: 1.40
BIC	2.20	2.21	2.24	2.15		
CV.1se	1.98	1.98	1.99	1.64	1.97	
CV.min	1.75	1.82	1.93	1.83	1.77	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.74	1.76	1.97	**1.57**		$\rho = 0.5$
AIC	1.98	1.99	2.01	1.93		$Oracle$: 1.26
BIC	1.98	1.98	2.01	1.93		
CV.1se	1.88	1.87	1.88	1.54	1.86	
CV.min	1.66	1.72	1.82	1.72	1.67	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.66	1.67	1.86	**1.5**		$\rho = 0.9$
AIC	1.87	1.88	1.90	1.83		$Oracle$: 1.19
BIC	1.87	1.88	1.90	1.82		
CV.1se	5.67	5.67	5.68	6.91	5.67	
CV.min	5.68	5.70	5.71	8.23	5.72	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**5.61**	7.11	8.94	6.01		$\rho = 0$
AIC	8.88	8.93	9.00	8.74		$Oracle$: 5.30
BIC	8.87	8.92	9.00	8.73		
CV.1se	5.08	5.08	5.08	6.21	5.08	
CV.min	5.09	5.11	5.11	7.39	5.13	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**5.03**	6.20	7.98	5.41		$\rho = 0.5$
AIC	7.93	7.98	8.04	7.81		$Oracle$: 4.74
BIC	7.93	7.97	8.04	7.81		
CV.1se	4.82	4.83	4.83	5.84	4.83	
CV.min	4.84	4.85	4.86	6.96	4.86	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**4.77**	5.83	7.57	5.14		$\rho = 0.9$
AIC	7.53	7.57	7.63	7.41		$Oracle$: 4.52
BIC	7.52	7.56	7.63	7.40		

Table 44: **Estimation MSE for n=100, binary design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	7.33	7.44	7.46	3.26	7.34	
CV.min	5.91	6.93	7.27	2.95	5.82	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	6.28	3.35	3.02	4.31		$\rho = 0$
AIC	2.98	3.00	3.03	**2.94**		$Oracle$: 2.73
BIC	2.98	3.00	3.03	**2.94**		
CV.1se	6.67	6.68	6.71	2.96	6.66	
CV.min	5.46	6.27	6.57	2.64	5.45	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.70	3.11	2.70	3.86		$\rho = 0.5$
AIC	2.67	2.68	2.71	**2.63**		$Oracle$: 2.45
BIC	2.67	2.68	2.71	**2.63**		
CV.1se	6.28	6.30	6.35	2.89	6.29	
CV.min	5.24	5.94	6.21	2.51	5.27	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.46	3.15	2.55	3.77		$\rho = 0.9$
AIC	2.52	2.54	2.56	**2.49**		$Oracle$: 2.31
BIC	2.52	2.54	2.56	**2.49**		
CV.1se	12.07	12.11	12.12	10.25	12.07	
CV.min	11.33	11.94	12.07	11.32	11.41	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	11.31	11.06	12.10	**10.12**		$\rho = 0$
AIC	11.96	12.05	12.14	11.78		$Oracle$: 9.58
BIC	11.96	12.04	12.14	11.77		
CV.1se	10.82	10.84	10.85	9.17	10.82	
CV.min	10.25	10.69	10.82	10.09	10.33	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	10.15	9.82	10.78	**9.06**		$\rho = 0.5$
AIC	10.66	10.73	10.82	10.49		$Oracle$: 8.54
BIC	10.65	10.72	10.82	10.49		
CV.1se	10.25	10.27	10.27	8.73	10.26	
CV.min	9.73	10.12	10.23	9.51	9.75	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	9.66	9.31	10.20	**8.66**		$\rho = 0.9$
AIC	10.09	10.16	10.24	9.93		$Oracle$: 8.05
BIC	10.08	10.15	10.24	9.93		
CV.1se	30.53	30.55	30.60	37.75	30.56	
CV.min	30.69	30.74	30.82	44.89	30.81	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**30.41**	45.69	48.52	32.65		$\rho = 0$
AIC	47.87	48.29	48.60	47.19		$Oracle$: 31.48
BIC	47.84	48.27	48.60	47.17		
CV.1se	27.31	27.33	27.33	33.73	27.33	
CV.min	27.44	27.49	27.51	39.84	27.55	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**27.22**	40.56	43.22	29.07		$\rho = 0.5$
AIC	42.66	43.03	43.30	42.06		$Oracle$: 28.08
BIC	42.64	43.01	43.30	42.04		
CV.1se	25.85	25.87	25.88	31.38	25.87	
CV.min	26.00	25.97	26.03	37.38	26.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**25.67**	38.25	40.92	27.59		$\rho = 0.9$
AIC	40.38	40.73	40.99	39.78		$Oracle$: 26.61
BIC	40.36	40.71	40.99	39.76		

Table 45: **Estimation MSE for n=100, binary design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	14.97	15.13	15.17	6.70	15.02	
CV.min	12.62	14.61	14.91	5.99	12.53	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	13.31	6.05	6.12	9.01		$\rho = 0$
AIC	6.04	6.08	6.13	**5.96**		$Oracle$: 6.12
BIC	6.04	6.08	6.13	**5.96**		
CV.1se	13.48	13.54	13.55	6.03	13.50	
CV.min	11.56	13.10	13.37	5.35	11.65	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	11.88	5.49	5.44	8.14		$\rho = 0.5$
AIC	5.37	5.41	5.45	5.31		$Oracle$: 5.45
BIC	5.37	5.41	5.45	**5.3**		
CV.1se	12.74	12.81	12.84	5.92	12.80	
CV.min	10.99	12.38	12.67	5.11	10.93	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	11.29	5.27	5.17	7.86		$\rho = 0.9$
AIC	5.10	5.14	5.18	**5.04**		$Oracle$: 5.16
BIC	5.10	5.13	5.18	**5.04**		
CV.1se	24.48	24.56	24.57	20.88	24.50	
CV.min	23.19	24.40	24.52	22.96	23.24	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	23.11	23.13	24.53	**20.63**		$\rho = 0$
AIC	24.21	24.42	24.58	23.85		$Oracle$: 21.34
BIC	24.20	24.41	24.58	23.84		
CV.1se	21.91	21.95	21.95	18.66	21.94	
CV.min	20.91	21.80	21.92	20.46	21.03	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	20.78	20.54	21.87	**18.48**		$\rho = 0.5$
AIC	21.58	21.76	21.91	21.26		$Oracle$: 19.00
BIC	21.57	21.76	21.91	21.25		
CV.1se	20.67	20.71	20.72	17.65	20.70	
CV.min	19.66	20.53	20.67	19.21	19.67	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	19.53	19.34	20.61	**17.53**		$\rho = 0.9$
AIC	20.35	20.51	20.66	20.05		$Oracle$: 17.97
BIC	20.34	20.50	20.66	20.04		
CV.1se	61.84	61.86	61.92	76.46	61.85	
CV.min	62.12	62.25	62.34	90.65	62.44	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**61.54**	94.48	98.16	66.07		$\rho = 0$
AIC	96.74	97.74	98.25	95.38		$Oracle$: 64.46
BIC	96.70	97.70	98.25	95.35		
CV.1se	55.33	55.40	55.36	68.27	55.34	
CV.min	55.59	55.77	55.74	80.79	55.83	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**55.07**	83.89	87.52	59.02		$\rho = 0.5$
AIC	86.29	87.15	87.62	85.08		$Oracle$: 57.58
BIC	86.25	87.11	87.62	85.05		
CV.1se	52.31	52.35	52.39	63.43	52.34	
CV.min	52.51	52.62	52.66	75.65	52.69	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**51.93**	79.08	82.74	55.84		$\rho = 0.9$
AIC	81.57	82.38	82.83	80.38		$Oracle$: 54.48
BIC	81.52	82.35	82.83	80.28		

Table 46: **Estimation MSE for n=100, binary design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	30.33	30.56	30.60	13.61	30.38	
CV.min	26.07	29.77	30.17	12.06	25.72	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	27.01	12.04	12.33	18.27		$\rho = 0$
AIC	12.15	12.26	12.34	**12**		$Oracle$: 12.55
BIC	12.15	12.26	12.34	**12**		
CV.1se	27.21	27.33	27.35	12.36	27.28	
CV.min	23.89	26.73	27.01	10.79	23.88	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	24.26	10.74	10.99	16.73		$\rho = 0.5$
AIC	10.83	10.93	11.00	**10.7**		$Oracle$: 11.21
BIC	10.83	10.92	11.00	**10.7**		
CV.1se	25.68	25.79	25.82	11.97	25.74	
CV.min	22.64	25.13	25.46	10.24	22.44	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	22.74	10.23	10.38	15.86		$\rho = 0.9$
AIC	10.24	10.33	10.39	**10.12**		$Oracle$: 10.60
BIC	10.23	10.32	10.39	**10.12**		
CV.1se	49.21	49.37	49.37	42.14	49.29	
CV.min	46.77	49.09	49.30	46.25	46.84	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	46.69	47.26	49.34	**41.64**		$\rho = 0$
AIC	48.63	49.11	49.40	47.93		$Oracle$: 46.19
BIC	48.61	49.09	49.40	47.91		
CV.1se	44.03	44.14	44.15	37.50	44.11	
CV.min	42.08	43.93	44.11	41.17	42.30	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	41.73	42.04	43.94	**37.24**		$\rho = 0.5$
AIC	43.31	43.73	43.99	42.68		$Oracle$: 41.04
BIC	43.29	43.72	43.99	42.67		
CV.1se	41.58	41.69	41.70	35.58	41.60	
CV.min	39.52	41.37	41.58	38.66	39.66	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	39.23	39.74	41.49	**35.18**		$\rho = 0.9$
AIC	40.90	41.29	41.54	40.32		$Oracle$: 38.90
BIC	40.88	41.27	41.54	40.30		
CV.1se	124.66	124.81	124.79	154.61	124.68	
CV.min	125.32	125.62	125.84	182.91	125.93	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**124.15**	193.36	198.18	133.05		$\rho = 0$
AIC	195.19	197.42	198.29	192.44		$Oracle$: 130.14
BIC	195.11	197.36	198.28	192.34		
CV.1se	111.25	111.38	111.34	136.84	111.28	
CV.min	111.79	112.04	112.02	162.37	112.21	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**110.75**	171.44	176.10	118.55		$\rho = 0.5$
AIC	173.46	175.42	176.20	171.07		$Oracle$: 116.03
BIC	173.39	175.35	176.19	171.01		
CV.1se	105.14	105.23	105.25	127.70	105.21	
CV.min	105.41	105.68	105.77	152.09	105.93	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**104.31**	161.77	166.42	112.41		$\rho = 0.9$
AIC	163.88	165.73	166.50	161.47		$Oracle$: 109.94
BIC	163.80	165.66	166.50	161.41		

Table 47: **Estimation MSE for n=100, continuous design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	4.07	3.93	4.31	2.11	3.58	
CV.min	2.44	2.60	3.40	**2.03**	2.52	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	2.89	3.36	2.23	2.24		$\rho = 0$
AIC	2.20	2.21	2.24	2.10		$Oracle$: 1.48
BIC	2.20	2.20	2.23	2.15		
CV.1se	2.01	1.97	1.89	1.04	1.82	
CV.min	1.54	1.55	1.68	0.84	1.44	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.57	1.81	1.01	1.16		$\rho = 0.5$
AIC	0.83	0.84	0.84	**0.82**		$Oracle$: 0.56
BIC	0.83	0.84	0.84	0.91		
CV.1se	0.40	0.39	0.34	0.29	0.37	
CV.min	0.32	0.32	0.32	0.22	0.31	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.32	0.35	0.33	0.25		$\rho = 0.9$
AIC	0.22	0.22	0.22	**0.2**		$Oracle$: 0.15
BIC	0.24	0.23	0.22	0.32		
CV.1se	8.82	8.80	8.92	7.23	8.80	
CV.min	7.73	8.04	8.56	8.16	7.76	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.66	8.50	8.88	**6.93**		$\rho = 0$
AIC	8.87	8.91	9.00	8.65		$Oracle$: 5.62
BIC	8.87	8.91	9.00	8.63		
CV.1se	3.39	3.38	3.36	2.83	3.36	
CV.min	3.11	3.16	3.26	3.07	3.11	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.08	3.29	3.31	**2.79**		$\rho = 0.5$
AIC	3.35	3.36	3.39	3.28		$Oracle$: 2.11
BIC	3.35	3.36	3.39	3.27		
CV.1se	0.84	0.82	0.74	0.72	0.79	
CV.min	0.71	0.71	0.69	0.70	0.69	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.70	0.74	0.71	**0.68**		$\rho = 0.9$
AIC	0.89	0.89	0.91	0.80		$Oracle$: 0.56
BIC	0.89	0.89	0.91	0.70		
CV.1se	22.83	22.84	22.85	27.74	22.85	
CV.min	22.87	22.91	23.01	33.04	22.94	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**22.53**	24.53	35.87	24.03		$\rho = 0$
AIC	35.61	35.81	36.11	35.06		$Oracle$: 21.25
BIC	35.59	35.80	36.10	35.04		
CV.1se	8.59	8.59	8.60	10.06	8.59	
CV.min	8.58	8.59	8.64	12.07	8.62	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**8.52**	8.61	13.38	9.09		$\rho = 0.5$
AIC	13.39	13.44	13.56	13.17		$Oracle$: 7.97
BIC	13.38	13.44	13.56	13.15		
CV.1se	2.33	2.32	2.32	2.29	2.32	
CV.min	2.26	2.26	2.29	2.53	2.26	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**2.24**	2.28	3.11	2.34		$\rho = 0.9$
AIC	3.61	3.62	3.67	3.44		$Oracle$: 2.11
BIC	3.60	3.62	3.67	2.66		

Table 48: **Estimation MSE for n=100, continuous design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	29.84	30.21	30.39	13.26	29.97	
CV.min	24.06	28.29	29.64	11.90	24.04	$\text{sd}(\mu)/\sigma = 2$
AICc	25.41	22.67	12.22	17.14		$\rho = 0$
AIC	12.07	12.15	12.26	11.89		$Oracle$: 11.08
BIC	12.07	12.14	12.26	**11.88**		
CV.1se	10.41	10.41	10.42	5.40	10.39	
CV.min	9.40	9.94	10.30	4.26	9.42	$\text{sd}(\mu)/\sigma = 2$
AICc	9.31	10.16	4.16	6.64		$\rho = 0.5$
AIC	4.13	4.15	4.18	4.09		$Oracle$: 3.78
BIC	4.13	4.14	4.18	**4.08**		
CV.1se	1.88	1.86	1.83	1.54	1.85	
CV.min	1.60	1.61	1.69	1.12	1.59	$\text{sd}(\mu)/\sigma = 2$
AICc	1.55	1.78	1.31	1.26		$\rho = 0.9$
AIC	0.75	0.75	0.76	**0.74**		$Oracle$: 0.68
BIC	0.75	0.75	0.76	1.38		
CV.1se	48.97	49.08	49.11	41.41	49.03	
CV.min	46.03	48.36	48.95	45.64	46.16	$\text{sd}(\mu)/\sigma = 1$
AICc	45.69	46.15	48.71	**40.67**		$\rho = 0$
AIC	48.15	48.51	48.87	47.37		$Oracle$: 38.53
BIC	48.13	48.49	48.86	47.35		
CV.1se	16.82	16.83	16.85	14.38	16.81	
CV.min	16.23	16.58	16.82	15.44	16.19	$\text{sd}(\mu)/\sigma = 1$
AICc	16.03	16.57	16.64	**14.36**		$\rho = 0.5$
AIC	16.54	16.62	16.77	16.30		$Oracle$: 13.23
BIC	16.53	16.61	16.76	16.29		
CV.1se	3.06	3.06	3.06	2.82	3.06	
CV.min	2.89	2.90	2.99	**2.61**	2.88	$\text{sd}(\mu)/\sigma = 1$
AICc	2.83	3.01	2.98	2.64		$\rho = 0.9$
AIC	2.99	3.00	3.04	2.88		$Oracle$: 2.37
BIC	2.99	3.00	3.04	2.87		
CV.1se	123.67	123.68	123.80	151.41	123.69	
CV.min	124.09	124.31	124.59	180.32	125.12	$\text{sd}(\mu)/\sigma = 0.5$
AICc	**122.78**	181.19	195.40	131.22		$\rho = 0$
AIC	192.75	194.48	195.68	189.98		$Oracle$: 126.96
BIC	192.67	194.40	195.66	189.91		
CV.1se	42.38	42.39	42.42	49.61	42.42	
CV.min	42.56	42.60	42.70	59.52	42.68	$\text{sd}(\mu)/\sigma = 0.5$
AICc	**42.17**	50.84	66.80	45.06		$\rho = 0.5$
AIC	66.10	66.57	67.06	65.12		$Oracle$: 43.47
BIC	66.07	66.53	67.05	65.09		
CV.1se	7.73	7.73	7.74	7.84	7.73	
CV.min	7.71	7.73	7.78	8.64	7.74	$\text{sd}(\mu)/\sigma = 0.5$
AICc	**7.66**	7.72	12.06	8.10		$\rho = 0.9$
AIC	11.97	12.05	12.19	11.58		$Oracle$: 7.75
BIC	11.96	12.05	12.18	10.18		

Table 49: **Estimation MSE for n=100, continuous design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	61.16	61.57	61.63	27.47	61.23	
CV.min	51.50	59.56	60.70	24.23	51.80	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	53.49	32.73	24.78	36.31		$\rho = 0$
AIC	24.45	24.64	24.82	**24.13**		$Oracle$: 24.83
BIC	24.44	24.63	24.82	24.14		
CV.1se	20.83	20.84	20.86	10.87	20.84	
CV.min	19.15	20.19	20.68	8.57	19.09	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	18.93	18.83	8.35	13.38		$\rho = 0.5$
AIC	8.26	8.30	8.37	**8.18**		$Oracle$: 8.37
BIC	8.25	8.30	8.37	8.21		
CV.1se	3.54	3.54	3.53	3.00	3.54	
CV.min	3.20	3.27	3.41	2.17	3.21	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.11	3.48	1.60	2.48		$\rho = 0.9$
AIC	1.40	1.40	1.42	**1.38**		$Oracle$: 1.42
BIC	1.40	1.40	1.42	2.30		
CV.1se	99.62	99.74	99.82	84.51	99.66	
CV.min	94.55	98.98	99.72	92.58	94.75	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	93.78	93.69	99.07	**83.67**		$\rho = 0$
AIC	97.75	98.62	99.27	96.27		$Oracle$: 86.46
BIC	97.71	98.58	99.26	96.23		
CV.1se	33.64	33.67	33.71	**28.79**	33.68	
CV.min	32.47	33.31	33.69	30.80	32.52	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	32.08	32.43	33.36	28.83		$\rho = 0.5$
AIC	33.02	33.24	33.49	32.55		$Oracle$: 29.19
BIC	33.00	33.22	33.49	32.53		
CV.1se	5.73	5.73	5.73	5.38	5.74	
CV.min	5.53	5.59	5.70	**4.97**	5.53	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.44	5.70	5.62	5.05		$\rho = 0.9$
AIC	5.58	5.61	5.68	5.42		$Oracle$: 4.90
BIC	5.58	5.61	5.68	5.44		
CV.1se	250.85	250.88	251.03	307.99	251.08	
CV.min	251.92	252.45	253.02	365.30	253.21	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**249.33**	381.45	396.97	266.84		$\rho = 0$
AIC	391.16	395.18	397.28	385.61		$Oracle$: 260.93
BIC	390.99	395.04	397.25	385.45		
CV.1se	84.75	84.79	84.80	98.73	84.80	
CV.min	85.25	85.31	85.31	118.99	85.26	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**84.43**	117.72	133.55	90.21		$\rho = 0.5$
AIC	131.83	132.94	133.82	129.89		$Oracle$: 87.87
BIC	131.76	132.88	133.81	129.82		
CV.1se	14.44	14.44	14.45	14.67	14.45	
CV.min	14.44	14.49	14.54	16.22	14.49	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**14.39**	14.47	22.61	15.14		$\rho = 0.9$
AIC	22.32	22.50	22.75	21.62		$Oracle$: 14.79
BIC	22.31	22.50	22.74	18.94		

Table 50: **Estimation MSE for n=100, continuous design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	123.78	124.17	124.38	55.67	123.87	
CV.min	105.81	121.52	122.75	48.79	106.45	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	109.36	52.25	49.94	74.35		$\rho = 0$
AIC	49.18	49.63	49.96	48.59		$Oracle$: 50.89
BIC	49.16	49.61	49.96	**48.58**		
CV.1se	41.62	41.63	41.66	21.97	41.60	
CV.min	38.52	40.66	41.36	17.13	38.32	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	37.84	29.69	16.67	26.77		$\rho = 0.5$
AIC	16.46	16.57	16.70	16.31		$Oracle$: 17.03
BIC	16.45	16.57	16.69	**16.3**		
CV.1se	6.86	6.85	6.85	5.93	6.86	
CV.min	6.37	6.53	6.75	4.25	6.36	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	6.19	6.79	2.75	4.94		$\rho = 0.9$
AIC	2.70	2.71	2.74	**2.67**		$Oracle$: 2.80
BIC	2.69	2.71	2.74	4.17		
CV.1se	200.18	200.56	200.62	170.55	200.38	
CV.min	190.91	199.28	200.41	186.30	190.80	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	189.24	191.81	199.68	**168.56**		$\rho = 0$
AIC	196.78	198.74	199.88	193.84		$Oracle$: 186.60
BIC	196.71	198.66	199.87	193.77		
CV.1se	67.24	67.30	67.34	**57.55**	67.30	
CV.min	64.84	66.87	67.31	61.27	64.94	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	64.19	63.51	66.78	**57.55**		$\rho = 0.5$
AIC	65.93	66.46	66.92	65.00		$Oracle$: 62.50
BIC	65.88	66.43	66.91	64.97		
CV.1se	11.08	11.07	11.08	10.48	11.08	
CV.min	10.75	10.89	11.04	**9.69**	10.77	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	10.58	11.04	10.92	9.86		$\rho = 0.9$
AIC	10.79	10.87	10.99	10.50		$Oracle$: 10.21
BIC	10.79	10.87	10.99	10.60		
CV.1se	505.57	505.68	505.88	621.63	505.30	
CV.min	507.03	508.25	509.82	736.30	509.71	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**502.04**	779.80	797.64	536.72		$\rho = 0$
AIC	787.28	796.26	799.84	776.11		$Oracle$: 527.53
BIC	786.99	795.99	799.78	775.79		
CV.1se	169.34	169.55	169.49	197.63	169.47	
CV.min	170.16	170.31	170.41	237.39	170.31	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**168.77**	252.44	267.51	180.60		$\rho = 0.5$
AIC	263.70	266.29	267.81	259.78		$Oracle$: 176.63
BIC	263.52	266.19	267.78	259.63		
CV.1se	27.83	27.83	27.85	28.27	27.84	
CV.min	27.80	27.97	28.03	31.23	27.92	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**27.75**	28.33	43.63	29.27		$\rho = 0.9$
AIC	43.01	43.43	43.86	41.67		$Oracle$: 28.81
BIC	42.99	43.41	43.84	36.55		

Table 51: **Estimation MSE for n=100, binary design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.64	0.57	0.63	**0.4**	0.47	
CV.min	0.42	**0.4**	0.46	0.41	**0.4**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.48	0.43	0.46	**0.4**		$\rho = 0$
AIC	0.47	0.47	0.48	0.44		$Oracle$: 0.27
BIC	0.47	0.47	0.48	0.44		
CV.1se	0.65	0.57	0.63	0.38	0.46	
CV.min	0.40	0.38	0.45	0.38	**0.37**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.47	0.41	0.41	0.39		$\rho = 0.5$
AIC	0.42	0.42	0.43	0.40		$Oracle$: 0.24
BIC	0.42	0.42	0.43	0.40		
CV.1se	0.64	0.56	0.63	**0.36**	0.45	
CV.min	0.39	0.38	0.45	**0.36**	**0.36**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.46	0.40	0.38	0.38		$\rho = 0.9$
AIC	0.40	0.40	0.41	0.38		$Oracle$: 0.23
BIC	0.40	0.40	0.41	0.38		
CV.1se	1.86	1.86	1.89	1.52	1.84	
CV.min	1.58	1.65	1.78	1.74	1.60	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.58	1.60	1.91	**1.45**		$\rho = 0$
AIC	1.91	1.92	1.94	1.86		$Oracle$: 1.09
BIC	1.91	1.92	1.94	1.85		
CV.1se	1.69	1.68	1.70	1.39	1.67	
CV.min	1.46	1.50	1.62	1.57	1.47	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.45	1.46	1.70	**1.32**		$\rho = 0.5$
AIC	1.71	1.72	1.74	1.66		$Oracle$: 0.97
BIC	1.71	1.72	1.73	1.66		
CV.1se	1.60	1.60	1.62	1.31	1.58	
CV.min	1.39	1.43	1.54	1.48	1.40	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.39	1.40	1.61	**1.26**		$\rho = 0.9$
AIC	1.62	1.63	1.64	1.58		$Oracle$: 0.92
BIC	1.62	1.63	1.64	1.57		
CV.1se	4.92	4.92	4.93	5.99	4.92	
CV.min	4.92	4.94	4.97	7.11	4.96	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**4.87**	5.98	7.74	5.20		$\rho = 0$
AIC	7.69	7.74	7.80	7.57		$Oracle$: 4.35
BIC	7.69	7.73	7.80	7.57		
CV.1se	4.40	4.40	4.41	5.38	4.40	
CV.min	4.41	4.42	4.43	6.39	4.44	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**4.36**	5.23	6.91	4.66		$\rho = 0.5$
AIC	6.87	6.91	6.97	6.77		$Oracle$: 3.90
BIC	6.87	6.91	6.97	6.76		
CV.1se	4.18	4.18	4.18	5.02	4.18	
CV.min	4.18	4.19	4.21	6.00	4.20	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**4.13**	4.86	6.53	4.42		$\rho = 0.9$
AIC	6.50	6.54	6.59	6.40		$Oracle$: 3.69
BIC	6.50	6.53	6.59	6.39		

Table 52: **Estimation MSE for n=100, binary design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	1.47	1.35	1.90	0.84	1.13	
CV.min	0.91	0.88	1.34	0.86	0.87	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.06	**0.83**	0.97	0.86		$\rho = 0$
AIC	0.98	0.98	1.00	0.93		$Oracle$: 0.56
BIC	0.98	0.98	1.00	0.92		
CV.1se	1.54	1.43	1.82	**0.79**	1.17	
CV.min	0.89	0.89	1.39	**0.79**	0.85	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.07	**0.79**	0.86	0.83		$\rho = 0.5$
AIC	0.88	0.88	0.89	0.84		$Oracle$: 0.50
BIC	0.88	0.88	0.89	0.84		
CV.1se	1.50	1.40	1.78	**0.76**	1.18	
CV.min	0.87	0.90	1.37	**0.76**	0.84	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.05	0.79	0.81	0.82		$\rho = 0.9$
AIC	0.83	0.83	0.84	0.79		$Oracle$: 0.48
BIC	0.83	0.83	0.84	0.79		
CV.1se	3.93	3.96	4.00	3.22	3.93	
CV.min	3.41	3.65	3.89	3.67	3.44	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.43	3.42	3.99	**3.09**		$\rho = 0$
AIC	3.97	3.99	4.03	3.87		$Oracle$: 2.25
BIC	3.96	3.99	4.03	3.86		
CV.1se	3.54	3.54	3.58	2.93	3.54	
CV.min	3.14	3.32	3.49	3.29	3.17	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.13	3.09	3.55	**2.82**		$\rho = 0.5$
AIC	3.54	3.56	3.59	3.46		$Oracle$: 2.01
BIC	3.54	3.55	3.59	3.45		
CV.1se	3.34	3.36	3.38	2.77	3.33	
CV.min	2.98	3.15	3.30	3.08	3.00	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.98	2.94	3.35	**2.68**		$\rho = 0.9$
AIC	3.34	3.35	3.39	3.26		$Oracle$: 1.90
BIC	3.33	3.35	3.39	3.26		
CV.1se	10.17	10.17	10.19	12.43	10.17	
CV.min	10.17	10.22	10.26	14.81	10.28	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**10.09**	14.04	16.09	10.77		$\rho = 0$
AIC	15.93	16.04	16.16	15.68		$Oracle$: 9.00
BIC	15.92	16.03	16.16	15.66		
CV.1se	9.09	9.10	9.11	11.13	9.10	
CV.min	9.13	9.13	9.16	13.22	9.18	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**9.02**	12.34	14.33	9.64		$\rho = 0.5$
AIC	14.20	14.29	14.40	13.98		$Oracle$: 8.05
BIC	14.19	14.29	14.40	13.97		
CV.1se	8.59	8.60	8.60	10.43	8.59	
CV.min	8.62	8.64	8.65	12.40	8.66	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**8.52**	11.58	13.53	9.14		$\rho = 0.9$
AIC	13.40	13.49	13.60	13.19		$Oracle$: 7.61
BIC	13.39	13.48	13.59	13.18		

Table 53: **Estimation MSE for n=100, binary design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	1.64	1.52	2.13	0.93	1.27	
CV.min	1.01	0.98	1.54	0.96	0.97	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.18	**0.92**	1.08	0.96		$\rho = 0$
AIC	1.09	1.09	1.11	1.03		$Oracle$: 0.62
BIC	1.09	1.09	1.11	1.02		
CV.1se	1.73	1.61	2.07	0.88	1.31	
CV.min	1.00	1.00	1.58	0.88	0.95	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.19	**0.86**	0.96	0.92		$\rho = 0.5$
AIC	0.97	0.97	0.99	0.93		$Oracle$: 0.56
BIC	0.97	0.97	0.99	0.93		
CV.1se	1.68	1.57	2.00	0.85	1.33	
CV.min	0.97	1.02	1.56	**0.84**	0.93	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.17	0.86	0.91	0.90		$\rho = 0.9$
AIC	0.92	0.92	0.93	0.88		$Oracle$: 0.53
BIC	0.92	0.92	0.93	0.88		
CV.1se	4.37	4.39	4.44	3.57	4.36	
CV.min	3.79	4.08	4.32	4.07	3.83	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.81	3.81	4.44	**3.44**		$\rho = 0$
AIC	4.41	4.43	4.48	4.30		$Oracle$: 2.50
BIC	4.40	4.43	4.48	4.29		
CV.1se	3.93	3.94	3.97	3.25	3.93	
CV.min	3.50	3.70	3.89	3.66	3.54	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.48	3.43	3.95	**3.13**		$\rho = 0.5$
AIC	3.93	3.95	3.99	3.84		$Oracle$: 2.23
BIC	3.93	3.95	3.99	3.84		
CV.1se	3.72	3.74	3.76	3.08	3.71	
CV.min	3.31	3.52	3.68	3.43	3.34	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.32	3.26	3.73	**2.98**		$\rho = 0.9$
AIC	3.71	3.73	3.77	3.63		$Oracle$: 2.11
BIC	3.71	3.73	3.77	3.63		
CV.1se	11.29	11.30	11.32	13.82	11.30	
CV.min	11.31	11.36	11.41	16.47	11.43	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**11.21**	15.81	17.90	11.99		$\rho = 0$
AIC	17.71	17.84	17.97	17.43		$Oracle$: 9.99
BIC	17.70	17.83	17.97	17.42		
CV.1se	10.09	10.09	10.10	12.37	10.09	
CV.min	10.15	10.14	10.17	14.68	10.19	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**10**	13.91	15.92	10.71		$\rho = 0.5$
AIC	15.76	15.87	15.99	15.52		$Oracle$: 8.94
BIC	15.76	15.86	15.99	15.51		
CV.1se	9.54	9.55	9.56	11.59	9.54	
CV.min	9.59	9.59	9.61	13.78	9.62	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**9.46**	13.05	15.04	10.15		$\rho = 0.9$
AIC	14.89	14.99	15.10	14.65		$Oracle$: 8.45
BIC	14.88	14.98	15.10	14.65		

Table 54: **Estimation MSE for n=100, binary design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	1.73	1.60	2.24	0.98	1.33	
CV.min	1.07	1.04	1.63	1.01	1.03	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.24	**0.96**	1.14	1.01		$\rho = 0$
AIC	1.15	1.15	1.17	1.09		$Oracle$: 0.66
BIC	1.15	1.15	1.17	1.08		
CV.1se	1.83	1.71	2.19	0.92	1.39	
CV.min	1.05	1.06	1.68	0.93	1.00	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.25	**0.9**	1.02	0.97		$\rho = 0.5$
AIC	1.03	1.03	1.04	0.98		$Oracle$: 0.59
BIC	1.03	1.03	1.04	0.98		
CV.1se	1.77	1.66	2.11	**0.89**	1.41	
CV.min	1.02	1.08	1.65	**0.89**	0.99	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.24	0.90	0.96	0.95		$\rho = 0.9$
AIC	0.97	0.97	0.99	0.93		$Oracle$: 0.56
BIC	0.97	0.97	0.99	0.93		
CV.1se	4.60	4.63	4.68	3.77	4.60	
CV.min	4.00	4.31	4.56	4.29	4.04	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	4.02	4.02	4.68	**3.62**		$\rho = 0$
AIC	4.64	4.67	4.72	4.53		$Oracle$: 2.63
BIC	4.64	4.67	4.72	4.52		
CV.1se	4.15	4.16	4.20	3.44	4.15	
CV.min	3.69	3.92	4.11	3.86	3.73	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.68	3.62	4.18	**3.31**		$\rho = 0.5$
AIC	4.15	4.18	4.22	4.06		$Oracle$: 2.36
BIC	4.15	4.17	4.22	4.06		
CV.1se	3.92	3.95	3.97	3.25	3.91	
CV.min	3.50	3.71	3.88	3.62	3.53	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	3.51	3.44	3.94	**3.14**		$\rho = 0.9$
AIC	3.91	3.94	3.97	3.83		$Oracle$: 2.23
BIC	3.91	3.93	3.97	3.82		
CV.1se	11.92	11.93	11.95	14.58	11.93	
CV.min	11.93	11.99	12.04	17.34	12.05	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**11.84**	16.71	18.88	12.64		$\rho = 0$
AIC	18.67	18.80	18.95	18.38		$Oracle$: 10.54
BIC	18.66	18.80	18.95	18.37		
CV.1se	10.65	10.66	10.67	13.06	10.65	
CV.min	10.72	10.71	10.73	15.50	10.77	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**10.57**	14.75	16.82	11.29		$\rho = 0.5$
AIC	16.65	16.76	16.89	16.39		$Oracle$: 9.44
BIC	16.64	16.75	16.89	16.38		
CV.1se	10.06	10.07	10.07	12.21	10.06	
CV.min	10.12	10.13	10.12	14.51	10.13	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**9.97**	13.86	15.85	10.70		$\rho = 0.9$
AIC	15.69	15.79	15.92	15.44		$Oracle$: 8.92
BIC	15.68	15.79	15.91	15.43		

Table 55: **Estimation MSE for n=100, continuous design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	2.65	2.33	2.63	1.63	1.93	
CV.min	1.71	1.64	1.90	1.64	**1.61**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.96	1.96	1.87	1.63		$\rho = 0$
AIC	1.89	1.89	1.92	1.77		$Oracle$: 1.09
BIC	1.89	1.89	1.92	1.77		
CV.1se	1.76	1.68	1.59	0.92	1.46	
CV.min	1.27	1.26	1.37	0.75	1.13	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.32	1.51	0.95	1.00		$\rho = 0.5$
AIC	0.75	0.75	0.76	**0.73**		$Oracle$: 0.43
BIC	0.75	0.75	0.76	0.85		
CV.1se	0.38	0.36	0.32	0.26	0.33	
CV.min	0.29	0.29	0.29	0.20	0.28	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.29	0.33	0.32	0.22		$\rho = 0.9$
AIC	0.19	0.19	0.20	**0.18**		$Oracle$: 0.11
BIC	0.20	0.20	0.20	0.30		
CV.1se	7.53	7.48	7.59	6.10	7.45	
CV.min	6.40	6.61	7.19	6.97	6.46	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.35	7.08	7.66	**5.83**		$\rho = 0$
AIC	7.68	7.71	7.80	7.45		$Oracle$: 4.37
BIC	7.67	7.71	7.80	7.42		
CV.1se	3.04	3.03	3.00	2.54	3.00	
CV.min	2.76	2.79	2.88	2.75	2.75	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.72	2.92	2.94	**2.47**		$\rho = 0.5$
AIC	3.01	3.02	3.05	2.93		$Oracle$: 1.71
BIC	3.00	3.01	3.04	2.92		
CV.1se	0.76	0.74	0.68	0.65	0.71	
CV.min	0.65	0.64	0.63	0.62	0.63	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.64	0.68	0.66	**0.61**		$\rho = 0.9$
AIC	0.78	0.78	0.80	0.71		$Oracle$: 0.45
BIC	0.78	0.78	0.80	0.64		
CV.1se	19.79	19.80	19.81	23.84	19.80	
CV.min	19.76	19.83	19.97	28.51	19.86	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**19.54**	20.74	31.03	20.74		$\rho = 0$
AIC	30.82	30.99	31.25	30.32		$Oracle$: 17.46
BIC	30.81	30.98	31.25	30.30		
CV.1se	7.76	7.76	7.77	9.11	7.76	
CV.min	7.76	7.77	7.81	10.85	7.79	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**7.68**	7.76	12.06	8.19		$\rho = 0.5$
AIC	12.08	12.13	12.24	11.88		$Oracle$: 6.84
BIC	12.07	12.12	12.23	11.86		
CV.1se	2.04	2.04	2.04	2.02	2.04	
CV.min	2.00	2.00	2.02	2.23	2.00	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**1.98**	2.01	2.75	2.08		$\rho = 0.9$
AIC	3.16	3.17	3.21	3.02		$Oracle$: 1.80
BIC	3.16	3.17	3.21	2.43		

Table 56: **Estimation MSE for n=100, continuous design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	6.03	5.47	7.37	**3.39**	4.50	
CV.min	3.66	3.54	5.12	3.45	3.45	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.24	3.93	3.83	3.46		$\rho = 0$
AIC	3.93	3.94	4.01	3.72		$Oracle$: 2.26
BIC	3.93	3.94	4.00	3.71		
CV.1se	3.71	3.68	3.68	1.86	3.59	
CV.min	2.90	3.04	3.39	1.52	2.83	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	2.94	3.45	1.54	2.11		$\rho = 0.5$
AIC	1.51	1.51	1.53	**1.48**		$Oracle$: 0.86
BIC	1.51	1.51	1.53	1.51		
CV.1se	0.76	0.73	0.66	0.55	0.64	
CV.min	0.55	0.55	0.57	0.41	0.54	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.56	0.68	0.61	0.47		$\rho = 0.9$
AIC	0.34	0.34	0.34	**0.33**		$Oracle$: 0.19
BIC	0.34	0.34	0.34	0.55		
CV.1se	15.86	15.92	16.11	12.87	15.83	
CV.min	13.74	14.70	15.65	14.59	13.88	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	13.72	15.18	16.02	**12.39**		$\rho = 0$
AIC	15.92	16.01	16.18	15.51		$Oracle$: 9.05
BIC	15.91	16.00	16.18	15.49		
CV.1se	6.15	6.15	6.15	5.16	6.14	
CV.min	5.74	5.87	6.06	5.58	5.74	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.67	6.04	6.02	**5.09**		$\rho = 0.5$
AIC	6.05	6.07	6.13	5.93		$Oracle$: 3.43
BIC	6.05	6.07	6.13	5.92		
CV.1se	1.38	1.37	1.35	1.20	1.34	
CV.min	1.24	1.24	1.28	**1.13**	1.21	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.22	1.34	1.32	**1.13**		$\rho = 0.9$
AIC	1.36	1.37	1.38	1.30		$Oracle$: 0.78
BIC	1.36	1.36	1.38	1.25		
CV.1se	41.10	41.10	41.16	49.82	41.10	
CV.min	41.17	41.36	41.49	59.63	41.39	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**40.65**	49.38	64.74	43.30		$\rho = 0$
AIC	64.05	64.49	65.00	63.04		$Oracle$: 36.24
BIC	64.02	64.47	64.99	63.01		
CV.1se	15.53	15.54	15.54	18.34	15.53	
CV.min	15.56	15.59	15.65	21.83	15.63	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**15.41**	15.84	24.32	16.43		$\rho = 0.5$
AIC	24.20	24.32	24.53	23.82		$Oracle$: 13.70
BIC	24.18	24.31	24.52	23.81		
CV.1se	3.54	3.54	3.54	3.58	3.54	
CV.min	3.52	3.54	3.55	3.95	3.53	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**3.49**	3.53	5.40	3.67		$\rho = 0.9$
AIC	5.47	5.49	5.56	5.28		$Oracle$: 3.12
BIC	5.46	5.49	5.56	4.57		

Table 57: **Estimation MSE for n=100, continuous design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	6.74	6.11	8.34	**3.77**	5.04	
CV.min	4.07	3.93	5.96	3.83	3.85	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.70	4.30	4.30	3.84		$\rho = 0$
AIC	4.38	4.39	4.46	4.14		$Oracle$: 2.52
BIC	4.37	4.39	4.46	4.13		
CV.1se	4.12	4.10	4.10	2.07	4.02	
CV.min	3.23	3.39	3.79	1.69	3.19	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.30	3.84	1.71	2.35		$\rho = 0.5$
AIC	1.67	1.68	1.70	**1.64**		$Oracle$: 0.95
BIC	1.67	1.68	1.70	1.69		
CV.1se	0.84	0.81	0.74	0.61	0.71	
CV.min	0.61	0.61	0.63	0.46	0.60	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.62	0.75	0.66	0.51		$\rho = 0.9$
AIC	0.37	0.37	0.38	**0.36**		$Oracle$: 0.21
BIC	0.37	0.38	0.38	0.59		
CV.1se	17.65	17.73	17.88	14.30	17.57	
CV.min	15.29	16.38	17.43	16.22	15.41	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	15.27	16.82	17.83	**13.78**		$\rho = 0$
AIC	17.69	17.80	17.98	17.24		$Oracle$: 10.05
BIC	17.68	17.79	17.98	17.21		
CV.1se	6.83	6.83	6.83	5.74	6.82	
CV.min	6.38	6.54	6.74	6.19	6.38	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.30	6.72	6.70	**5.66**		$\rho = 0.5$
AIC	6.71	6.74	6.80	6.59		$Oracle$: 3.80
BIC	6.71	6.73	6.80	6.58		
CV.1se	1.53	1.52	1.50	1.33	1.49	
CV.min	1.37	1.37	1.43	**1.25**	1.35	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.35	1.49	1.45	**1.25**		$\rho = 0.9$
AIC	1.50	1.51	1.53	1.44		$Oracle$: 0.86
BIC	1.50	1.51	1.53	1.40		
CV.1se	45.57	45.59	45.62	55.20	45.57	
CV.min	45.65	45.85	45.98	66.11	45.94	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**45.06**	56.09	71.78	48.00		$\rho = 0$
AIC	70.97	71.48	72.03	69.85		$Oracle$: 40.18
BIC	70.94	71.46	72.01	69.82		
CV.1se	17.26	17.26	17.27	20.38	17.26	
CV.min	17.28	17.32	17.40	24.29	17.37	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**17.13**	17.71	27.06	18.28		$\rho = 0.5$
AIC	26.90	27.05	27.27	26.48		$Oracle$: 15.23
BIC	26.89	27.04	27.27	26.47		
CV.1se	3.90	3.90	3.90	3.96	3.90	
CV.min	3.89	3.90	3.92	4.37	3.90	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**3.86**	3.90	5.99	4.06		$\rho = 0.9$
AIC	6.03	6.06	6.14	5.83		$Oracle$: 3.44
BIC	6.03	6.06	6.13	5.05		

Table 58: **Estimation MSE for n=100, continuous design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	7.14	6.46	8.81	**3.97**	5.31	
CV.min	4.29	4.15	6.14	4.04	4.07	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.01	4.53	4.53	4.04		$\rho = 0$
AIC	4.62	4.63	4.71	4.36		$Oracle$: 2.65
BIC	4.61	4.62	4.70	4.35		
CV.1se	4.35	4.31	4.32	2.18	4.24	
CV.min	3.40	3.59	4.01	1.78	3.37	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.48	4.06	1.81	2.47		$\rho = 0.5$
AIC	1.77	1.77	1.79	**1.73**		$Oracle$: 1.00
BIC	1.77	1.77	1.79	1.79		
CV.1se	0.89	0.85	0.78	0.65	0.75	
CV.min	0.64	0.64	0.67	0.49	0.63	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.66	0.79	0.69	0.54		$\rho = 0.9$
AIC	0.39	0.40	0.40	**0.38**		$Oracle$: 0.23
BIC	0.39	0.40	0.40	0.62		
CV.1se	18.66	18.75	18.91	15.12	18.55	
CV.min	16.14	17.34	18.41	17.11	16.33	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	16.16	17.75	18.84	**14.55**		$\rho = 0$
AIC	18.68	18.80	18.99	18.21		$Oracle$: 10.62
BIC	18.67	18.79	18.99	18.18		
CV.1se	7.19	7.19	7.19	6.05	7.19	
CV.min	6.72	6.89	7.10	6.52	6.72	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.63	7.07	7.06	**5.96**		$\rho = 0.5$
AIC	7.07	7.10	7.17	6.94		$Oracle$: 4.01
BIC	7.07	7.10	7.17	6.93		
CV.1se	1.61	1.60	1.58	1.40	1.56	
CV.min	1.45	1.45	1.50	**1.32**	1.42	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	1.42	1.57	1.53	**1.32**		$\rho = 0.9$
AIC	1.59	1.59	1.61	1.52		$Oracle$: 0.91
BIC	1.58	1.59	1.61	1.47		
CV.1se	48.12	48.15	48.19	58.23	48.13	
CV.min	48.20	48.43	48.57	69.84	48.51	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**47.6**	59.96	75.78	50.67		$\rho = 0$
AIC	74.93	75.47	76.04	73.75		$Oracle$: 42.43
BIC	74.89	75.44	76.03	73.72		
CV.1se	18.22	18.22	18.23	21.49	18.22	
CV.min	18.26	18.28	18.35	25.58	18.33	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**18.08**	18.83	28.56	19.27		$\rho = 0.5$
AIC	28.38	28.53	28.78	27.94		$Oracle$: 16.07
BIC	28.36	28.52	28.77	27.92		
CV.1se	4.11	4.11	4.11	4.17	4.11	
CV.min	4.10	4.11	4.14	4.61	4.11	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**4.07**	4.11	6.32	4.28		$\rho = 0.9$
AIC	6.36	6.39	6.47	6.14		$Oracle$: 3.62
BIC	6.36	6.39	6.47	5.28		

Table 59: **Estimation MSE for n=1000, binary design, dense covariates, and decay 10**.

	lasso	GL $\gamma=1$	GL $\gamma=10$	marginal AL	sparsenet MCP	
CV.1se	0.34	0.34	0.33	0.33	0.32	
CV.min	0.32	0.32	**0.31**	0.32	**0.31**	$\mathrm{sd}(\mu)/\sigma=2$
AICc	0.32	0.32	**0.31**	0.32		$\rho=0$
AIC	0.42	0.42	0.45	0.32		
BIC	0.35	0.34	0.32	0.33		$Oracle$: 0.30
CV.1se	0.31	0.30	0.29	0.30	0.29	
CV.min	0.29	0.29	**0.28**	0.29	**0.28**	$\mathrm{sd}(\mu)/\sigma=2$
AICc	0.29	0.29	**0.28**	0.29		$\rho=0.5$
AIC	0.37	0.38	0.40	0.29		
BIC	0.32	0.31	0.29	0.30		$Oracle$: 0.26
CV.1se	0.29	0.29	0.28	0.28	0.27	
CV.min	0.28	0.27	**0.26**	0.27	**0.26**	$\mathrm{sd}(\mu)/\sigma=2$
AICc	0.28	0.27	**0.26**	0.27		$\rho=0.9$
AIC	0.35	0.35	0.37	0.27		
BIC	0.30	0.29	0.27	0.28		$Oracle$: 0.25
CV.1se	1.34	1.32	1.29	1.25	1.27	
CV.min	1.26	1.25	**1.23**	1.28	**1.23**	$\mathrm{sd}(\mu)/\sigma=1$
AICc	1.26	1.25	1.27	1.27		$\rho=0$
AIC	1.85	1.87	2.00	1.31		
BIC	1.35	1.31	1.28	1.27		$Oracle$: 1.17
CV.1se	1.21	1.18	1.15	1.12	1.13	
CV.min	1.14	1.12	**1.1**	1.15	**1.1**	$\mathrm{sd}(\mu)/\sigma=1$
AICc	1.14	1.12	1.13	1.13		$\rho=0.5$
AIC	1.65	1.67	1.78	1.18		
BIC	1.22	1.18	1.15	1.14		$Oracle$: 1.05
CV.1se	1.14	1.12	1.09	1.06	1.07	
CV.min	1.08	1.06	**1.04**	1.08	**1.04**	$\mathrm{sd}(\mu)/\sigma=1$
AICc	1.08	1.06	1.07	1.08		$\rho=0.9$
AIC	1.55	1.57	1.68	1.11		
BIC	1.16	1.12	1.09	1.09		$Oracle$: 0.99
CV.1se	5.21	5.16	5.11	4.90	5.07	
CV.min	4.93	**4.89**	4.90	5.20	**4.89**	$\mathrm{sd}(\mu)/\sigma=0.5$
AICc	4.92	**4.89**	5.17	5.08		$\rho=0$
AIC	7.90	8.06	8.55	6.07		
BIC	5.13	5.09	5.21	4.95		$Oracle$: 4.66
CV.1se	4.68	4.62	4.57	4.39	4.53	
CV.min	4.42	4.38	4.38	4.67	**4.37**	$\mathrm{sd}(\mu)/\sigma=0.5$
AICc	4.41	4.38	4.62	4.55		$\rho=0.5$
AIC	7.06	7.19	7.62	5.44		
BIC	4.62	4.57	4.64	4.46		$Oracle$: 4.16
CV.1se	4.43	4.38	4.33	4.17	4.28	
CV.min	4.18	4.15	4.16	4.40	**4.14**	$\mathrm{sd}(\mu)/\sigma=0.5$
AICc	4.18	4.15	4.38	4.31		$\rho=0.9$
AIC	6.66	6.78	7.20	5.08		
BIC	4.39	4.34	4.41	4.23		$Oracle$: 3.93

Table 60: **Estimation MSE for n=1000, binary design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	2.22	2.18	2.18	2.15	2.10	
CV.min	2.07	2.03	2.05	2.07	**2.01**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	2.14	2.06	2.04	2.09		$\rho = 0$
AIC	2.52	2.56	2.73	2.07		$Oracle$: 1.77
BIC	2.82	2.60	2.38	2.47		
CV.1se	1.99	1.96	1.95	1.95	1.88	
CV.min	1.85	1.82	1.83	1.87	**1.79**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.93	1.85	1.82	1.89		$\rho = 0.5$
AIC	2.25	2.28	2.43	1.87		$Oracle$: 1.57
BIC	2.63	2.38	2.13	2.27		
CV.1se	1.87	1.84	1.83	1.85	1.77	
CV.min	1.75	1.71	1.72	1.77	**1.69**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.82	1.75	1.71	1.79		$\rho = 0.9$
AIC	2.11	2.14	2.28	1.77		$Oracle$: 1.48
BIC	2.50	2.27	2.00	2.16		
CV.1se	8.48	8.43	8.71	7.83	8.19	
CV.min	7.81	7.79	8.13	7.85	7.79	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.91	**7.76**	8.54	7.80		$\rho = 0$
AIC	10.67	10.91	11.60	8.52		$Oracle$: 6.88
BIC	10.46	9.64	10.63	8.90		
CV.1se	7.64	7.56	7.75	7.05	7.34	
CV.min	7.00	6.96	7.23	7.05	6.98	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.11	**6.95**	7.54	7.01		$\rho = 0.5$
AIC	9.49	9.69	10.29	7.65		$Oracle$: 6.11
BIC	9.75	8.86	9.54	8.14		
CV.1se	7.20	7.13	7.36	6.69	6.92	
CV.min	6.61	6.57	6.86	6.67	6.59	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.72	**6.56**	7.11	6.64		$\rho = 0.9$
AIC	8.92	9.11	9.68	7.18		$Oracle$: 5.75
BIC	9.29	8.44	9.08	7.77		
CV.1se	30.41	30.51	30.62	28.92	30.45	
CV.min	28.91	29.51	30.38	30.23	28.94	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**28.81**	29.04	32.33	29.50		$\rho = 0$
AIC	44.19	45.58	47.69	36.58		$Oracle$: 26.71
BIC	30.59	30.57	30.65	30.31		
CV.1se	27.07	27.11	27.19	25.86	27.08	
CV.min	25.89	26.35	27.03	27.01	25.93	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**25.77**	25.89	29.02	26.38		$\rho = 0.5$
AIC	39.26	40.45	42.30	32.78		$Oracle$: 23.69
BIC	27.17	27.16	27.20	26.98		
CV.1se	25.52	25.57	25.62	24.47	25.56	
CV.min	24.45	24.87	25.48	25.45	24.47	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**24.32**	24.42	27.06	24.91		$\rho = 0.9$
AIC	36.90	38.04	39.80	30.65		$Oracle$: 22.33
BIC	25.60	25.59	25.63	25.45		

Table 61: **Estimation MSE for n=1000, binary design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	4.93	4.93	5.13	4.95	4.74	
CV.min	4.56	4.55	4.77	4.69	**4.54**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.97	4.74	4.69	4.82		$\rho = 0$
AIC	5.26	5.36	5.71	4.65		$Oracle$: 3.92
BIC	11.76	7.65	5.74	6.80		
CV.1se	4.43	4.41	4.59	4.50	4.26	
CV.min	4.09	**4.06**	4.25	4.25	**4.06**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.49	4.27	4.16	4.37		$\rho = 0.5$
AIC	4.68	4.76	5.06	4.19		$Oracle$: 3.47
BIC	12.00	7.34	5.10	6.48		
CV.1se	4.17	4.16	4.31	4.30	4.00	
CV.min	3.86	**3.83**	3.99	4.04	**3.83**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.24	4.03	3.93	4.17		$\rho = 0.9$
AIC	4.40	4.47	4.76	3.97		$Oracle$: 3.27
BIC	11.64	7.13	4.80	6.31		
CV.1se	18.86	19.46	22.40	17.23	18.29	
CV.min	**16.91**	17.35	20.03	17.04	**16.91**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	17.48	17.08	18.88	17.04		$\rho = 0$
AIC	21.90	22.52	23.77	18.38		$Oracle$: 14.88
BIC	24.64	24.28	24.73	22.96		
CV.1se	17.09	17.59	20.25	15.52	16.55	
CV.min	**15.17**	15.53	18.18	15.31	**15.17**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	15.75	15.30	16.73	15.32		$\rho = 0.5$
AIC	19.43	19.95	21.04	16.45		$Oracle$: 13.17
BIC	21.85	21.67	21.93	20.83		
CV.1se	16.11	16.52	19.24	14.72	15.62	
CV.min	**14.32**	14.64	17.15	14.48	14.33	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	14.91	14.44	15.77	14.52		$\rho = 0.9$
AIC	18.27	18.76	19.80	15.47		$Oracle$: 12.42
BIC	20.60	20.48	20.64	19.70		
CV.1se	61.85	61.95	61.96	59.96	61.90	
CV.min	60.09	61.49	61.94	62.57	60.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**59.74**	61.12	64.65	60.97		$\rho = 0$
AIC	89.79	93.17	96.87	76.06		$Oracle$: 56.30
BIC	61.93	61.94	61.96	61.79		
CV.1se	54.84	54.89	54.90	53.43	54.87	
CV.min	53.63	54.59	54.90	55.72	53.68	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**53.28**	54.24	57.69	54.35		$\rho = 0.5$
AIC	79.60	82.49	85.78	67.95		$Oracle$: 49.87
BIC	54.88	54.89	54.90	54.78		
CV.1se	51.68	51.71	51.72	50.51	51.71	
CV.min	50.61	51.47	51.72	52.52	50.62	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**50.25**	51.16	54.14	51.30		$\rho = 0.9$
AIC	74.83	77.59	80.74	63.52		$Oracle$: 46.94
BIC	51.70	51.70	51.72	51.63		

Table 62: **Estimation MSE for n=1000, binary design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	11.14	11.67	14.02	11.52	10.67	
CV.min	10.01	10.28	11.57	10.65	**9.96**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	12.40	11.26	10.74	11.43		$\rho = 0$
AIC	10.87	11.12	11.75	10.29		$Oracle$: 8.99
BIC	31.02	30.70	22.48	28.59		
CV.1se	10.11	10.55	13.01	10.54	9.67	
CV.min	8.99	9.22	10.54	9.69	**8.93**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	11.39	10.18	9.56	10.45		$\rho = 0.5$
AIC	9.65	9.86	10.40	9.29		$Oracle$: 7.97
BIC	27.48	27.38	21.35	26.13		
CV.1se	9.46	9.91	12.60	10.08	9.07	
CV.min	8.46	8.67	9.98	9.21	**8.41**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	10.75	9.61	9.01	9.99		$\rho = 0.9$
AIC	9.07	9.27	9.78	8.78		$Oracle$: 7.51
BIC	25.87	25.76	20.43	24.77		
CV.1se	42.32	46.60	49.69	37.25	41.22	
CV.min	36.36	40.66	48.78	36.41	**36.32**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	38.68	36.96	40.79	36.80		$\rho = 0$
AIC	44.46	45.96	48.21	38.73		$Oracle$: 32.78
BIC	49.76	49.76	49.81	49.26		
CV.1se	38.81	42.45	44.07	33.54	38.03	
CV.min	32.89	37.27	43.45	**32.7**	32.83	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	35.14	33.13	36.23	33.10		$\rho = 0.5$
AIC	39.44	40.71	42.68	34.60		$Oracle$: 29.03
BIC	44.09	44.08	44.12	43.75		
CV.1se	36.66	39.88	41.48	31.83	36.00	
CV.min	31.09	34.94	40.95	**30.91**	31.05	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	33.09	31.24	34.04	31.35		$\rho = 0.9$
AIC	37.06	38.26	40.14	32.51		$Oracle$: 27.37
BIC	41.50	41.50	41.53	41.22		
CV.1se	124.61	124.67	124.67	122.31	124.65	
CV.min	122.59	124.58	124.76	127.56	122.60	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**121.94**	127.84	127.54	124.38		$\rho = 0$
AIC	181.11	189.10	195.52	155.43		$Oracle$: 118.96
BIC	124.65	124.67	126.69	124.53		
CV.1se	110.36	110.39	110.40	108.74	110.39	
CV.min	109.04	110.34	110.47	113.45	109.10	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**108.53**	112.85	113.18	110.60		$\rho = 0.5$
AIC	160.43	167.29	173.04	138.30		$Oracle$: 105.41
BIC	110.38	110.39	110.77	110.31		
CV.1se	103.91	103.92	103.92	102.63	103.92	
CV.min	102.75	103.86	103.98	106.77	102.85	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**102.27**	106.26	106.53	104.36		$\rho = 0.9$
AIC	150.74	157.29	162.82	129.44		$Oracle$: 99.15
BIC	103.90	103.92	104.37	103.84		

Table 63: **Estimation MSE for n=1000, continuous design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	1.38	1.35	1.31	1.32	1.28	
CV.min	1.30	1.28	1.25	1.27	**1.24**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.30	1.28	1.27	1.27		$\rho = 0$
AIC	1.68	1.69	1.78	1.27		$Oracle$: 1.18
BIC	1.42	1.37	1.32	1.32		
CV.1se	0.56	0.55	0.51	0.61	0.49	
CV.min	0.53	0.51	0.49	0.59	**0.47**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.53	0.52	0.49	0.59		$\rho = 0.5$
AIC	0.61	0.61	0.63	0.59		$Oracle$: 0.45
BIC	0.64	0.60	0.54	0.61		
CV.1se	0.16	0.15	0.14	0.17	0.14	
CV.min	0.15	0.15	0.14	0.17	**0.13**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.15	0.15	0.14	0.17		$\rho = 0.9$
AIC	0.15	0.14	0.14	0.17		$Oracle$: 0.12
BIC	0.20	0.19	0.17	0.17		
CV.1se	5.39	5.29	5.15	5.00	5.10	
CV.min	5.08	5.01	4.95	5.13	**4.94**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.08	5.02	5.06	5.08		$\rho = 0$
AIC	7.41	7.50	8.01	5.27		$Oracle$: 4.70
BIC	5.41	5.32	5.32	5.09		
CV.1se	2.19	2.12	2.01	2.08	1.94	
CV.min	2.04	1.99	1.92	2.07	**1.88**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.04	1.99	1.94	2.06		$\rho = 0.5$
AIC	2.69	2.72	2.89	2.07		$Oracle$: 1.77
BIC	2.34	2.25	2.12	2.23		
CV.1se	0.64	0.61	0.56	0.54	0.54	
CV.min	0.58	0.57	0.54	**0.52**	0.53	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58	0.57	0.55	**0.52**		$\rho = 0.9$
AIC	0.61	0.61	0.65	**0.52**		$Oracle$: 0.48
BIC	0.69	0.68	0.68	0.54		
CV.1se	20.93	20.70	20.51	19.70	20.35	
CV.min	19.78	19.65	19.69	20.92	**19.64**	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	19.76	19.76	20.60	20.41		$\rho = 0$
AIC	31.66	32.29	34.25	24.31		$Oracle$: 18.68
BIC	20.61	20.65	21.70	19.92		
CV.1se	8.31	8.18	8.01	7.93	7.74	
CV.min	7.81	7.71	7.65	8.19	**7.48**	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	7.78	7.73	7.97	8.10		$\rho = 0.5$
AIC	11.66	11.85	12.62	8.89		$Oracle$: 7.04
BIC	8.21	8.20	8.22	8.11		
CV.1se	2.18	2.17	2.12	2.05	2.15	
CV.min	2.09	2.09	2.08	**2.02**	2.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	2.09	2.09	2.08	2.03		$\rho = 0.9$
AIC	2.66	2.74	3.05	2.03		$Oracle$: 1.91
BIC	2.10	2.09	2.08	2.07		

Table 64: **Estimation MSE for n=1000, continuous design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	8.89	8.75	8.73	8.62	8.46	
CV.min	8.29	8.15	8.22	8.31	**8.07**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	8.58	8.33	8.21	8.36		$\rho = 0$
AIC	10.11	10.26	10.96	8.32		$Oracle$: 7.12
BIC	11.38	10.69	10.16	9.86		
CV.1se	3.36	3.26	3.14	3.80	3.02	
CV.min	3.10	3.02	2.95	3.53	**2.89**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.36	3.18	2.92	3.60		$\rho = 0.5$
AIC	3.44	3.46	3.65	3.49		$Oracle$: 2.44
BIC	7.68	5.31	3.78	5.59		
CV.1se	0.63	0.61	0.58	1.17	0.56	
CV.min	0.59	0.57	**0.55**	1.10	**0.55**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.65	0.61	**0.55**	1.10		$\rho = 0.9$
AIC	0.59	0.57	0.56	1.10		$Oracle$: 0.44
BIC	1.67	1.66	1.65	1.25		
CV.1se	34.06	33.85	34.98	31.42	32.94	
CV.min	31.34	**31.26**	32.68	31.51	31.30	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	31.83	31.40	33.52	31.27		$\rho = 0$
AIC	42.77	43.75	46.49	34.15		$Oracle$: 27.62
BIC	42.03	40.64	48.29	35.76		
CV.1se	13.53	12.89	13.06	12.68	11.78	
CV.min	11.81	11.55	11.96	12.24	**11.26**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	12.25	11.78	11.53	12.34		$\rho = 0.5$
AIC	14.53	14.78	15.67	12.45		$Oracle$: 9.45
BIC	16.62	16.65	16.79	16.24		
CV.1se	2.91	2.78	2.71	2.50	2.29	
CV.min	2.64	2.45	2.48	2.35	**2.15**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.67	2.67	2.62	2.35		$\rho = 0.9$
AIC	2.29	2.32	2.52	2.34		$Oracle$: 1.72
BIC	2.84	2.84	2.82	2.79		
CV.1se	122.32	122.70	123.15	116.28	122.44	
CV.min	116.26	118.42	122.17	121.45	116.33	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**115.83**	118.96	123.27	118.51		$\rho = 0$
AIC	177.17	182.78	191.21	146.86		$Oracle$: 107.15
BIC	123.05	123.19	123.26	121.93		
CV.1se	42.16	42.17	42.17	41.75	42.16	
CV.min	41.82	41.91	42.11	43.03	41.82	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**41.56**	42.03	42.18	42.51		$\rho = 0.5$
AIC	60.25	61.81	64.90	50.74		$Oracle$: 36.65
BIC	42.13	42.15	42.17	42.06		
CV.1se	7.70	7.69	7.67	7.60	7.70	
CV.min	7.50	7.49	7.47	7.50	**7.46**	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	7.49	7.51	7.49	7.52		$\rho = 0.9$
AIC	9.77	10.11	11.15	7.60		$Oracle$: 6.68
BIC	7.53	7.54	7.54	7.48		

Table 65: **Estimation MSE for n=1000, continuous design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	19.75	19.76	20.62	19.85	19.04	
CV.min	18.30	18.24	19.12	18.83	**18.2**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	19.91	19.17	18.81	19.30		$\rho = 0$
AIC	21.09	21.49	22.88	18.63		$Oracle$: 15.73
BIC	46.55	33.24	24.57	27.18		
CV.1se	7.50	7.32	7.19	9.12	7.09	
CV.min	6.74	**6.63**	6.69	8.03	6.70	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	8.11	7.40	6.65	8.66		$\rho = 0.5$
AIC	7.16	7.24	7.62	7.58		$Oracle$: 5.31
BIC	20.78	20.81	17.61	20.27		
CV.1se	1.32	1.28	1.23	2.70	1.26	
CV.min	1.18	1.16	1.15	2.39	1.19	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.51	1.32	1.16	2.40		$\rho = 0.9$
AIC	1.18	**1.14**	1.15	2.36		$Oracle$: 0.90
BIC	3.33	3.33	3.31	3.28		
CV.1se	75.68	78.22	89.56	69.05	73.29	
CV.min	**67.78**	69.59	80.16	68.33	67.80	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	70.19	69.24	77.65	68.32		$\rho = 0$
AIC	87.75	90.22	95.25	73.65		$Oracle$: 59.71
BIC	98.91	98.92	99.42	91.76		
CV.1se	32.61	32.35	33.50	27.99	31.66	
CV.min	27.83	28.32	32.85	26.47	27.79	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	28.71	27.60	27.00	27.01		$\rho = 0.5$
AIC	29.61	30.23	31.88	**26.46**		$Oracle$: 20.16
BIC	33.51	33.54	33.58	33.30		
CV.1se	5.69	5.68	5.64	5.37	5.66	
CV.min	5.46	5.44	5.46	4.96	5.37	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.41	5.49	5.47	4.92		$\rho = 0.9$
AIC	**4.51**	4.59	5.00	4.75		$Oracle$: 3.43
BIC	5.51	5.51	5.48	5.47		
CV.1se	248.48	248.75	248.83	240.83	248.64	
CV.min	241.25	246.89	248.80	251.00	241.20	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**239.87**	247.57	248.98	244.78		$\rho = 0$
AIC	359.81	373.33	388.16	305.32		$Oracle$: 225.74
BIC	248.75	248.83	260.38	248.16		
CV.1se	84.04	84.04	84.04	83.70	84.04	
CV.min	83.75	83.95	84.07	86.35	83.78	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**83.45**	84.01	84.08	85.29		$\rho = 0.5$
AIC	120.66	124.51	130.20	103.48		$Oracle$: 76.23
BIC	84.03	84.04	84.04	83.99		
CV.1se	14.33	14.33	14.33	14.29	14.34	
CV.min	14.17	14.16	14.17	14.21	14.15	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**14.13**	14.20	14.25	14.25		$\rho = 0.9$
AIC	18.82	19.62	21.33	14.53		$Oracle$: 12.97
BIC	14.23	14.25	14.31	14.17		

Table 66: **Estimation MSE for n=1000, continuous design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	44.42	46.71	56.79	46.06	42.76	
CV.min	40.06	41.17	46.59	42.63	**39.87**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	49.74	45.58	43.24	45.76		$\rho = 0$
AIC	43.49	44.52	47.03	41.20		$Oracle$: 36.05
BIC	124.28	124.46	72.81	114.38		
CV.1se	20.11	21.43	39.27	23.34	19.23	
CV.min	15.20	15.65	34.29	19.50	15.17	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	26.86	19.33	15.30	22.13		$\rho = 0.5$
AIC	**14.76**	14.97	15.68	16.30		$Oracle$: 12.09
BIC	41.76	41.80	41.06	41.46		
CV.1se	5.61	5.64	6.78	6.32	6.14	
CV.min	4.01	4.16	6.49	5.32	4.91	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	6.40	6.11	2.57	5.28		$\rho = 0.9$
AIC	2.40	**2.37**	2.43	4.53		$Oracle$: 1.98
BIC	6.66	6.66	6.64	6.60		
CV.1se	169.30	187.88	199.29	149.02	165.35	
CV.min	**145.46**	163.65	195.22	145.76	145.47	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	155.35	149.68	176.34	147.26		$\rho = 0$
AIC	178.00	184.00	193.01	154.99		$Oracle$: 131.43
BIC	199.52	199.72	199.19	197.28		
CV.1se	66.93	67.00	67.02	59.80	66.97	
CV.min	64.04	65.70	66.87	55.90	63.97	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	63.18	65.26	63.30	57.33		$\rho = 0.5$
AIC	59.68	61.25	64.28	**54.73**		$Oracle$: 44.09
BIC	66.99	67.02	67.02	66.86		
CV.1se	11.00	11.00	10.99	10.89	11.01	
CV.min	10.74	10.74	10.76	10.35	10.73	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	10.65	10.82	10.84	10.27		$\rho = 0.9$
AIC	**9.05**	9.31	10.04	9.44		$Oracle$: 7.22
BIC	10.86	10.87	10.92	10.78		
CV.1se	499.75	499.92	499.94	490.79	499.87	
CV.min	491.34	499.45	500.31	511.49	491.87	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**488.97**	501.61	499.93	498.68		$\rho = 0$
AIC	725.13	757.08	782.66	623.41		$Oracle$: 476.83
BIC	499.85	499.93	702.82	499.40		
CV.1se	167.73	167.73	167.73	167.37	167.73	
CV.min	167.35	167.70	167.82	172.56	167.40	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**166.89**	167.74	167.73	170.57		$\rho = 0.5$
AIC	241.13	250.55	260.98	208.44		$Oracle$: 159.94
BIC	167.72	167.73	169.58	167.68		
CV.1se	27.55	27.55	27.55	27.53	27.55	
CV.min	27.44	27.45	27.50	27.54	27.44	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**27.39**	27.50	27.54	27.60		$\rho = 0.9$
AIC	36.95	38.80	41.67	28.31		$Oracle$: 26.20
BIC	27.52	27.53	27.55	27.47		

Table 67: **Estimation MSE for n=1000, binary design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.34	0.34	0.33	0.33	0.32	
CV.min	0.32	0.32	**0.31**	0.32	**0.31**	$\text{sd}(\mu)/\sigma = 2$
AICc	0.32	0.32	**0.31**	0.32		$\rho = 0$
AIC	0.42	0.42	0.45	0.32		$Oracle$: **0.31**
BIC	0.35	0.34	0.32	0.33		
CV.1se	0.31	0.30	0.29	0.30	0.29	
CV.min	0.29	0.29	**0.28**	0.29	**0.28**	$\text{sd}(\mu)/\sigma = 2$
AICc	0.29	0.29	**0.28**	0.29		$\rho = 0.5$
AIC	0.37	0.38	0.40	0.29		$Oracle$: **0.28**
BIC	0.32	0.31	0.29	0.30		
CV.1se	0.29	0.29	0.28	0.28	0.27	
CV.min	0.28	0.27	**0.26**	0.27	**0.26**	$\text{sd}(\mu)/\sigma = 2$
AICc	0.28	0.27	**0.26**	0.27		$\rho = 0.9$
AIC	0.35	0.35	0.37	0.27		$Oracle$: **0.26**
BIC	0.30	0.29	0.27	0.28		
CV.1se	1.34	1.32	1.29	1.25	1.27	
CV.min	1.26	1.25	**1.23**	1.28	**1.23**	$\text{sd}(\mu)/\sigma = 1$
AICc	1.26	1.25	1.27	1.27		$\rho = 0$
AIC	1.85	1.87	2.00	1.31		$Oracle$: 1.24
BIC	1.35	1.31	1.29	1.27		
CV.1se	1.21	1.18	1.15	1.12	1.13	
CV.min	1.14	1.12	**1.1**	1.15	**1.1**	$\text{sd}(\mu)/\sigma = 1$
AICc	1.14	1.12	1.13	1.14		$\rho = 0.5$
AIC	1.65	1.67	1.78	1.18		$Oracle$: 1.11
BIC	1.22	1.18	1.15	1.14		
CV.1se	1.14	1.12	1.09	1.06	1.07	
CV.min	1.08	1.06	**1.04**	1.08	**1.04**	$\text{sd}(\mu)/\sigma = 1$
AICc	1.08	1.06	1.07	1.08		$\rho = 0.9$
AIC	1.55	1.57	1.68	1.11		$Oracle$: 1.05
BIC	1.16	1.12	1.09	1.09		
CV.1se	5.21	5.16	5.11	4.90	5.07	
CV.min	4.93	**4.89**	4.90	5.20	**4.89**	$\text{sd}(\mu)/\sigma = 0.5$
AICc	4.92	**4.89**	5.17	5.08		$\rho = 0$
AIC	7.90	8.06	8.55	6.07		$Oracle$: 4.98
BIC	5.14	5.09	5.21	4.96		
CV.1se	4.68	4.62	4.56	4.39	4.53	
CV.min	4.42	4.38	4.38	4.67	**4.37**	$\text{sd}(\mu)/\sigma = 0.5$
AICc	4.41	4.38	4.62	4.55		$\rho = 0.5$
AIC	7.06	7.19	7.62	5.44		$Oracle$: 4.44
BIC	4.62	4.57	4.64	4.46		
CV.1se	4.43	4.38	4.33	4.17	4.28	
CV.min	4.18	4.15	4.16	4.40	**4.13**	$\text{sd}(\mu)/\sigma = 0.5$
AICc	4.18	4.15	4.38	4.31		$\rho = 0.9$
AIC	6.65	6.78	7.20	5.08		$Oracle$: 4.20
BIC	4.39	4.34	4.40	4.23		

Table 68: **Estimation MSE for n=1000, binary design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	2.11	2.06	2.02	2.04	1.97	
CV.min	1.98	1.93	1.91	1.97	**1.89**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	2.03	1.95	1.93	1.98		$\rho = 0$
AIC	2.47	2.50	2.68	1.98		
BIC	2.59	2.38	2.18	2.29		$Oracle$: 1.66
CV.1se	1.90	1.85	1.81	1.85	1.76	
CV.min	1.78	1.73	1.71	1.78	**1.69**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.83	1.76	1.71	1.79		$\rho = 0.5$
AIC	2.20	2.23	2.38	1.79		
BIC	2.40	2.19	1.95	2.12		$Oracle$: 1.47
CV.1se	1.79	1.74	1.70	1.76	1.65	
CV.min	1.68	1.64	1.61	1.69	**1.59**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.73	1.66	1.62	1.70		$\rho = 0.9$
AIC	2.07	2.09	2.23	1.69		
BIC	2.28	2.08	1.84	2.02		$Oracle$: 1.38
CV.1se	8.24	8.17	8.39	7.62	7.95	
CV.min	7.60	7.57	7.86	7.64	7.58	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.69	**7.54**	8.30	7.58		$\rho = 0$
AIC	10.46	10.70	11.38	8.30		
BIC	10.06	9.29	10.18	8.59		$Oracle$: 6.62
CV.1se	7.42	7.33	7.47	6.86	7.11	
CV.min	6.82	6.77	6.99	6.87	6.78	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.92	**6.76**	7.35	6.82		$\rho = 0.5$
AIC	9.31	9.51	10.10	7.46		
BIC	9.38	8.53	9.14	7.86		$Oracle$: 5.88
CV.1se	6.99	6.92	7.11	6.51	6.71	
CV.min	6.44	6.39	6.65	6.49	6.40	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.54	**6.38**	6.88	6.46		$\rho = 0.9$
AIC	8.75	8.94	9.50	7.00		
BIC	8.98	8.13	8.69	7.50		$Oracle$: 5.54
CV.1se	29.81	29.91	30.03	28.31	29.84	
CV.min	28.31	28.88	29.78	29.60	28.34	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**28.2**	28.41	31.56	28.90		$\rho = 0$
AIC	43.35	44.71	46.79	35.84		
BIC	30.01	29.97	30.07	29.69		$Oracle$: 26.48
CV.1se	26.57	26.62	26.70	25.36	26.60	
CV.min	25.38	25.82	26.53	26.50	25.42	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**25.25**	25.38	28.50	25.87		$\rho = 0.5$
AIC	38.55	39.72	41.54	32.20		
BIC	26.68	26.67	26.72	26.49		$Oracle$: 23.53
CV.1se	25.05	25.11	25.16	23.99	25.10	
CV.min	23.95	24.36	25.01	24.95	23.99	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**23.85**	23.94	26.63	24.43		$\rho = 0.9$
AIC	36.24	37.35	39.09	30.06		
BIC	25.15	25.13	25.18	24.98		$Oracle$: 22.16

Table 69: **Estimation MSE for n=1000, binary design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	3.76	3.61	3.36	3.65	3.30	
CV.min	3.56	3.43	**3.26**	3.53	**3.26**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.67	3.47	3.35	3.55		$\rho = 0$
AIC	4.47	4.55	4.87	3.57		$Oracle$: 2.94
BIC	4.59	4.06	3.62	4.07		
CV.1se	3.38	3.23	2.98	3.31	2.91	
CV.min	3.20	3.08	2.90	3.20	**2.88**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.30	3.11	2.98	3.23		$\rho = 0.5$
AIC	3.98	4.05	4.32	3.23		$Oracle$: 2.61
BIC	4.23	3.69	3.20	3.78		
CV.1se	3.18	3.04	2.83	3.16	2.76	
CV.min	3.02	2.91	2.75	3.04	**2.72**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	3.12	2.94	2.81	3.07		$\rho = 0.9$
AIC	3.74	3.81	4.07	3.06		$Oracle$: 2.46
BIC	4.04	3.51	3.04	3.63		
CV.1se	15.29	15.35	16.83	14.13	14.78	
CV.min	13.96	14.04	15.26	14.06	**13.95**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	14.24	13.96	15.45	14.00		$\rho = 0$
AIC	18.83	19.34	20.48	15.33		$Oracle$: 11.78
BIC	21.17	19.98	21.18	17.90		
CV.1se	13.82	13.84	15.21	12.77	13.33	
CV.min	12.54	12.58	13.66	12.68	12.53	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	12.85	**12.52**	13.71	12.65		$\rho = 0.5$
AIC	16.74	17.18	18.16	13.77		$Oracle$: 10.46
BIC	18.86	18.33	18.89	16.72		
CV.1se	13.02	13.04	14.46	12.13	12.59	
CV.min	11.84	11.86	13.02	12.00	11.83	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	12.15	**11.82**	12.94	11.98		$\rho = 0.9$
AIC	15.75	16.16	17.10	12.95		$Oracle$: 9.86
BIC	17.80	17.37	17.79	16.04		
CV.1se	53.36	53.48	53.51	51.35	53.41	
CV.min	51.39	52.79	53.45	53.56	51.43	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**51.14**	52.09	55.86	52.29		$\rho = 0$
AIC	77.50	80.32	83.64	65.12		$Oracle$: 47.14
BIC	53.49	53.50	53.52	53.31		
CV.1se	47.42	47.49	47.51	45.88	47.46	
CV.min	46.02	46.99	47.48	47.86	46.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**45.75**	46.41	50.02	46.73		$\rho = 0.5$
AIC	68.81	71.22	74.17	58.32		$Oracle$: 41.82
BIC	47.49	47.49	47.51	47.37		
CV.1se	44.74	44.79	44.80	43.44	44.78	
CV.min	43.47	44.38	44.80	45.16	43.50	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**43.18**	43.79	46.92	44.14		$\rho = 0.9$
AIC	64.73	67.04	69.87	54.55		$Oracle$: 39.43
BIC	44.79	44.79	44.81	44.69		

Table 70: **Estimation MSE for n=1000, binary design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	5.50	5.19	4.63	5.29	4.56	
CV.min	5.24	4.99	4.60	5.13	**4.55**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.39	5.03	4.76	5.16		$\rho = 0$
AIC	6.62	6.76	7.25	5.24		
BIC	6.47	5.65	4.98	5.74		$Oracle$: 4.33
CV.1se	4.93	4.64	4.09	4.81	4.01	
CV.min	4.70	4.46	4.08	4.66	**4**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.85	4.51	4.20	4.69		$\rho = 0.5$
AIC	5.89	6.00	6.43	4.73		
BIC	5.94	5.10	4.38	5.31		$Oracle$: 3.84
CV.1se	4.65	4.38	3.88	4.59	3.81	
CV.min	4.44	4.22	3.88	4.43	**3.78**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.59	4.26	3.97	4.46		$\rho = 0.9$
AIC	5.54	5.65	6.05	4.49		
BIC	5.65	4.82	4.15	5.08		$Oracle$: 3.62
CV.1se	22.82	23.17	26.71	21.08	22.03	
CV.min	**20.74**	21.00	23.69	20.92	**20.74**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	21.25	20.81	23.26	20.86		$\rho = 0$
AIC	27.81	28.66	30.26	22.86		
BIC	31.33	30.68	31.31	28.86		$Oracle$: 17.32
CV.1se	20.66	20.93	24.44	19.07	19.93	
CV.min	**18.64**	18.82	21.57	18.87	**18.64**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	19.17	18.65	20.58	18.86		$\rho = 0.5$
AIC	24.70	25.42	26.82	20.50		
BIC	27.83	27.60	27.86	26.46		$Oracle$: 15.36
CV.1se	19.48	19.76	23.30	18.14	18.83	
CV.min	17.62	17.78	20.53	17.88	**17.61**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	18.13	17.63	19.45	17.89		$\rho = 0.9$
AIC	23.26	23.95	25.28	19.30		
BIC	26.26	26.12	26.29	25.22		$Oracle$: 14.49
CV.1se	78.47	78.59	78.62	75.90	78.53	
CV.min	76.00	78.08	78.62	79.15	76.01	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**75.6**	77.89	81.00	77.21		$\rho = 0$
AIC	114.01	118.59	123.13	96.44		
BIC	78.59	78.61	78.62	78.42		$Oracle$: 69.25
CV.1se	69.71	69.78	69.79	67.79	69.75	
CV.min	68.02	69.44	69.81	70.68	68.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**67.61**	69.22	72.36	68.97		$\rho = 0.5$
AIC	101.21	105.15	109.20	86.21		
BIC	69.77	69.78	69.79	69.65		$Oracle$: 61.43
CV.1se	65.81	65.86	65.86	64.21	65.85	
CV.min	64.32	65.58	65.89	66.75	64.36	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**63.9**	65.37	68.08	65.23		$\rho = 0.9$
AIC	95.28	99.04	102.94	80.65		
BIC	65.85	65.85	65.86	65.75		$Oracle$: 57.96

Table 71: **Estimation MSE for n=1000, continuous design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	1.38	1.35	1.31	1.32	1.28	
CV.min	1.30	1.28	1.25	1.27	**1.24**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.30	1.28	1.27	1.27		$\rho = 0$
AIC	1.68	1.69	1.79	1.27		$Oracle$: 1.25
BIC	1.42	1.37	1.32	1.32		
CV.1se	0.56	0.55	0.51	0.61	0.49	
CV.min	0.53	0.51	0.49	0.59	**0.47**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.53	0.52	0.49	0.59		$\rho = 0.5$
AIC	0.61	0.61	0.63	0.59		$Oracle$: **0.47**
BIC	0.64	0.60	0.54	0.61		
CV.1se	0.16	0.15	0.14	0.17	0.14	
CV.min	0.15	0.15	0.14	0.17	**0.13**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.15	0.15	0.14	0.17		$\rho = 0.9$
AIC	0.15	0.14	0.14	0.17		$Oracle$: **0.13**
BIC	0.20	0.19	0.17	0.17		
CV.1se	5.39	5.29	5.15	5.00	5.10	
CV.min	5.08	5.01	4.95	5.13	**4.94**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.08	5.02	5.06	5.08		$\rho = 0$
AIC	7.41	7.50	8.01	5.27		$Oracle$: 4.99
BIC	5.42	5.32	5.32	5.09		
CV.1se	2.19	2.12	2.01	2.08	1.94	
CV.min	2.04	1.99	1.92	2.07	**1.88**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	2.04	1.99	1.94	2.06		$\rho = 0.5$
AIC	2.69	2.72	2.89	2.07		$Oracle$: **1.88**
BIC	2.34	2.25	2.12	2.23		
CV.1se	0.64	0.61	0.56	0.54	0.54	
CV.min	0.58	0.57	0.54	**0.52**	0.53	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58	0.57	0.55	**0.52**		$\rho = 0.9$
AIC	0.61	0.61	0.65	**0.52**		$Oracle$: 0.51
BIC	0.69	0.68	0.68	0.54		
CV.1se	20.93	20.70	20.50	19.70	20.35	
CV.min	19.78	19.65	19.69	20.92	**19.64**	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	19.76	19.76	20.60	20.41		$\rho = 0$
AIC	31.66	32.29	34.25	24.31		$Oracle$: 19.97
BIC	20.61	20.65	21.70	19.91		
CV.1se	8.31	8.18	8.01	7.93	7.74	
CV.min	7.82	7.71	7.66	8.19	**7.48**	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	7.78	7.74	7.98	8.10		$\rho = 0.5$
AIC	11.66	11.85	12.62	8.89		$Oracle$: 7.53
BIC	8.22	8.21	8.22	8.12		
CV.1se	2.18	2.17	2.12	2.05	2.15	
CV.min	2.09	2.09	2.08	**2.02**	2.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	2.09	2.09	2.08	2.03		$\rho = 0.9$
AIC	2.66	2.74	3.05	2.03		$Oracle$: 2.04
BIC	2.10	2.09	2.08	2.07		

Table 72: **Estimation MSE for n=1000, continuous design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	8.47	8.27	8.11	8.19	7.90	
CV.min	7.94	7.76	7.67	7.92	**7.61**	$\text{sd}(\mu)/\sigma = 2$
AICc	8.15	7.88	7.74	7.95		$\rho = 0$
AIC	9.89	10.03	10.73	7.94		$Oracle$: 6.65
BIC	10.42	9.81	9.31	9.16		
CV.1se	3.20	3.09	2.93	3.63	2.81	
CV.min	2.98	2.89	2.78	3.38	**2.71**	$\text{sd}(\mu)/\sigma = 2$
AICc	3.18	3.01	2.76	3.44		$\rho = 0.5$
AIC	3.35	3.38	3.57	3.36		$Oracle$: 2.28
BIC	6.83	4.77	3.50	5.19		
CV.1se	0.61	0.59	0.55	1.14	0.53	
CV.min	0.57	0.55	0.53	1.08	**0.52**	$\text{sd}(\mu)/\sigma = 2$
AICc	0.62	0.58	0.53	1.08		$\rho = 0.9$
AIC	0.57	0.55	0.54	1.08		$Oracle$: 0.42
BIC	1.64	1.64	1.59	1.21		
CV.1se	33.07	32.79	33.77	30.55	31.94	
CV.min	30.50	**30.37**	31.59	30.66	30.41	$\text{sd}(\mu)/\sigma = 1$
AICc	30.93	30.49	32.44	30.41		$\rho = 0$
AIC	41.93	42.89	45.60	33.25		$Oracle$: 26.59
BIC	40.50	39.02	47.09	34.53		
CV.1se	13.10	12.48	12.58	12.37	11.41	
CV.min	11.51	11.24	11.59	11.95	**10.93**	$\text{sd}(\mu)/\sigma = 1$
AICc	11.92	11.46	11.22	12.03		$\rho = 0.5$
AIC	14.26	14.50	15.38	12.16		$Oracle$: 9.11
BIC	16.31	16.34	16.49	15.92		
CV.1se	2.86	2.70	2.63	2.46	2.21	
CV.min	2.56	2.37	2.38	2.31	**2.09**	$\text{sd}(\mu)/\sigma = 1$
AICc	2.60	2.59	2.53	2.31		$\rho = 0.9$
AIC	2.26	2.28	2.48	2.30		$Oracle$: 1.68
BIC	2.80	2.80	2.78	2.75		
CV.1se	119.93	120.31	120.82	113.86	120.03	
CV.min	113.81	115.93	119.70	118.93	113.89	$\text{sd}(\mu)/\sigma = 0.5$
AICc	**113.42**	116.46	120.93	116.06		$\rho = 0$
AIC	173.78	179.27	187.58	144.00		$Oracle$: 106.35
BIC	120.69	120.84	120.92	119.52		
CV.1se	41.42	41.42	41.42	40.99	41.42	
CV.min	41.07	41.14	41.36	42.25	41.06	$\text{sd}(\mu)/\sigma = 0.5$
AICc	**40.82**	41.28	41.44	41.71		$\rho = 0.5$
AIC	59.16	60.69	63.73	49.77		$Oracle$: 36.43
BIC	41.38	41.40	41.42	41.31		
CV.1se	7.60	7.59	7.57	7.50	7.60	
CV.min	7.40	7.39	7.37	7.40	**7.36**	$\text{sd}(\mu)/\sigma = 0.5$
AICc	7.39	7.41	7.39	7.42		$\rho = 0.9$
AIC	9.64	9.97	11.00	7.50		$Oracle$: 6.70
BIC	7.43	7.44	7.43	7.38		

Table 73: **Estimation MSE for n=1000, continuous design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	15.10	14.47	13.52	14.64	13.24	
CV.min	14.30	13.80	**13.11**	14.18	13.12	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	14.72	14.01	13.45	14.25		$\rho = 0$
AIC	17.93	18.24	19.55	14.33		$Oracle$: 11.82
BIC	18.30	16.69	14.97	16.28		
CV.1se	5.57	5.26	4.71	6.67	4.41	
CV.min	5.32	5.06	4.65	6.10	**4.39**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.67	5.23	4.64	6.35		$\rho = 0.5$
AIC	6.07	6.12	6.49	5.98		$Oracle$: 4.01
BIC	17.96	17.51	5.13	16.69		
CV.1se	1.01	0.96	0.86	2.24	0.82	
CV.min	0.97	0.92	0.85	2.01	**0.81**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.06	0.97	0.85	2.02		$\rho = 0.9$
AIC	0.96	0.93	0.94	2.01		$Oracle$: 0.70
BIC	2.91	2.92	2.88	2.82		
CV.1se	61.30	61.63	67.80	56.69	59.40	
CV.min	**56.03**	56.36	61.20	56.45	56.05	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	57.25	56.51	61.22	56.21		$\rho = 0$
AIC	75.47	77.53	82.05	61.51		$Oracle$: 47.30
BIC	85.09	84.04	85.85	71.78		
CV.1se	26.22	25.20	28.27	23.25	23.48	
CV.min	21.83	21.47	26.06	22.17	**21.11**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	22.98	21.55	21.26	22.50		$\rho = 0.5$
AIC	25.54	26.06	27.54	22.37		$Oracle$: 16.04
BIC	29.05	29.08	29.14	28.80		
CV.1se	5.02	4.99	4.96	4.61	4.79	
CV.min	4.76	4.68	4.79	4.25	4.36	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	4.74	4.81	4.76	4.23		$\rho = 0.9$
AIC	**3.92**	3.98	4.36	4.11		$Oracle$: 2.80
BIC	4.86	4.86	4.83	4.81		
CV.1se	214.42	214.86	215.02	206.23	214.59	
CV.min	206.43	212.06	214.78	214.96	206.33	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**205.31**	212.39	215.21	209.69		$\rho = 0$
AIC	310.41	321.76	335.07	261.14		$Oracle$: 189.14
BIC	214.89	215.00	217.26	214.16		
CV.1se	72.92	72.92	72.92	72.56	72.92	
CV.min	72.61	72.80	72.95	74.88	72.64	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**72.32**	72.89	72.96	73.92		$\rho = 0.5$
AIC	104.61	107.80	112.84	89.35		$Oracle$: 64.15
BIC	72.91	72.92	72.92	72.88		
CV.1se	12.72	12.72	12.71	12.66	12.72	
CV.min	12.53	12.53	12.53	12.57	12.51	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**12.5**	12.58	12.60	12.60		$\rho = 0.9$
AIC	16.60	17.27	18.84	12.81		$Oracle$: 11.20
BIC	12.61	12.62	12.69	12.54		

Table 74: **Estimation MSE for n=1000, continuous design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	22.06	20.83	18.60	21.21	18.31	
CV.min	21.02	20.04	18.49	20.59	**18.26**	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	21.63	20.28	19.18	20.69		$\rho = 0$
AIC	26.52	27.07	29.04	21.02		
BIC	26.07	23.17	20.23	23.08		$Oracle$: 17.37
CV.1se	8.07	7.45	6.44	9.77	**6.03**	
CV.min	7.79	7.30	6.54	8.91	6.04	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	8.27	7.47	6.47	9.35		$\rho = 0.5$
AIC	8.98	9.08	9.65	8.69		
BIC	26.50	25.09	6.71	25.92		$Oracle$: 5.87
CV.1se	1.44	1.33	1.17	3.34	**1.09**	
CV.min	1.39	1.31	1.18	2.88	1.10	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	1.51	1.35	1.16	2.90		$\rho = 0.9$
AIC	1.39	1.34	1.41	2.84		
BIC	4.27	4.28	3.44	4.21		$Oracle$: 1.01
CV.1se	91.40	92.90	107.18	84.53	88.38	
CV.min	83.20	84.26	95.00	83.92	**83.19**	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	85.14	84.21	93.73	83.70		$\rho = 0$
AIC	111.39	114.82	121.21	91.72		
BIC	125.83	125.78	126.15	116.17		$Oracle$: 69.47
CV.1se	40.67	40.08	42.55	34.99	39.34	
CV.min	34.02	34.26	41.87	33.17	33.76	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	35.81	32.73	**32.27**	33.80		$\rho = 0.5$
AIC	37.63	38.50	40.63	33.23		
BIC	42.62	42.64	42.67	42.42		$Oracle$: 23.49
CV.1se	7.28	7.27	7.23	6.96	7.25	
CV.min	6.96	6.94	6.98	6.41	6.89	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.90	7.03	7.00	6.35		$\rho = 0.9$
AIC	**5.77**	5.89	6.45	5.97		
BIC	7.09	7.11	7.11	7.01		$Oracle$: 4.03
CV.1se	315.28	315.72	315.85	304.89	315.47	
CV.min	305.33	313.63	315.86	317.57	305.18	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**303.58**	314.44	315.81	309.81		$\rho = 0$
AIC	456.70	475.12	493.35	386.66		
BIC	315.72	315.81	351.65	314.97		$Oracle$: 277.88
CV.1se	106.78	106.79	106.78	106.40	106.79	
CV.min	106.43	106.70	106.84	109.83	106.46	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**106.08**	106.77	106.79	108.39		$\rho = 0.5$
AIC	153.36	158.62	165.71	131.58		
BIC	106.77	106.78	106.79	106.75		$Oracle$: 93.96
CV.1se	18.33	18.33	18.32	18.28	18.33	
CV.min	18.14	18.15	18.20	18.18	18.14	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	**18.1**	18.22	18.29	18.23		$\rho = 0.9$
AIC	24.24	25.34	27.45	18.64		
BIC	18.25	18.28	18.32	18.18		$Oracle$: 16.13

Table 75: **Nonzero coefficients at n=100, binary design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	10.27	6.8	2.15	40.73	7.02	
CV.min	46.71	25.28	5.6	70.51	34.93	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	20.3	15.31	49.62	26.53		$\rho = 0$
AIC	109.15	96.42	74.5	86.93		$Oracle$: 21.25
BIC	107.58	94.95	73.11	80.43		
CV.1se	8.49	5.59	1.91	41.74	5.52	
CV.min	41.33	23.91	5.15	72.56	28.29	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	18.79	14.63	50.08	26.91		$\rho = 0.5$
AIC	110.09	97.3	75.5	88.14		$Oracle$: 20.95
BIC	108.36	95.99	74.14	83.13		
CV.1se	7.83	5.05	1.68	40.55	5.59	
CV.min	40.17	22.04	4.69	70.46	26.4	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	18.22	13.82	49.99	26.66		$\rho = 0.9$
AIC	109.97	97.37	75.89	88.06		$Oracle$: 20.71
BIC	108.41	95.98	74.52	82.55		
CV.1se	1.81	0.77	0.25	45.13	1.53	
CV.min	19.6	6.41	1.06	78.51	17.37	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	10.38	12.39	52.62	23.34		$\rho = 0$
AIC	112.87	97.64	75.83	93.21		$Oracle$: 14.52
BIC	111.57	95.91	73.99	92.05		
CV.1se	1.2	0.53	0.23	47.02	1.04	
CV.min	16.82	5.74	0.95	79.98	14.55	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	10.03	10.77	52.56	23.15		$\rho = 0.5$
AIC	113.35	98.15	76.48	93.57		$Oracle$: 14.39
BIC	112.01	96.85	74.6	92.26		
CV.1se	1.36	0.77	0.26	44.47	1.26	
CV.min	16.81	6.04	1.02	77.34	14.41	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	9.84	9.51	51.91	23.51		$\rho = 0.9$
AIC	113.02	98.35	76.9	93.64		$Oracle$: 14.05
BIC	111.6	96.94	74.91	92.05		
CV.1se	0.27	0.05	0.02	48.27	0.55	
CV.min	7.44	1.22	0.23	81.9	7.52	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.64	30.06	55.3	20.57		$\rho = 0$
AIC	115.24	95.81	73.4	96.25		$Oracle$: 7.82
BIC	114.03	94.19	71.41	95.64		
CV.1se	0.29	0.1	0.03	48.6	0.5	
CV.min	7.52	1.27	0.26	83.11	7.38	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.61	26.75	54.85	21.48		$\rho = 0.5$
AIC	115.25	96.35	74.18	96.43		$Oracle$: 7.96
BIC	113.81	94.91	72.11	95.78		
CV.1se	0.38	0.1	0.04	46.61	0.51	
CV.min	7.59	1.24	0.25	80.87	7.52	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.84	25.25	55.49	21.38		$\rho = 0.9$
AIC	115.14	96.36	74.23	96.08		$Oracle$: 7.57
BIC	114	94.73	72.25	95.28		

Table 76: **Nonzero coefficients at n=100, binary design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	1.34	0.2	0.07	53.16	1.06	
CV.min	17.15	2.34	0.45	85.15	18.97	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	8.05	37.06	55.48	22.98		$\rho = 0$
AIC	113.89	93.58	71.13	95.05		$Oracle$: 56.85
BIC	112.8	91.86	69.5	94.36		
CV.1se	0.63	0.18	0.06	51.6	0.71	
CV.min	15.5	2.1	0.36	84.16	15.71	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	7.89	35.41	55.16	23.4		$\rho = 0.5$
AIC	114.46	94.27	72.03	95.35		$Oracle$: 56.18
BIC	113.28	92.48	70.15	94.78		
CV.1se	0.84	0.24	0.05	49.94	0.74	
CV.min	14.96	1.93	0.37	82.39	13.87	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	7.28	33.16	55.39	22.38		$\rho = 0.9$
AIC	114.37	94.58	72.16	95.4		$Oracle$: 56.48
BIC	113.12	92.84	70.35	94.57		
CV.1se	0.53	0.06	0.03	50.93	0.68	
CV.min	10.62	1.05	0.24	84.51	9.83	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.39	42.84	56.81	22.2		$\rho = 0$
AIC	114.97	92.18	69.79	96.23		$Oracle$: 31.69
BIC	113.77	90.33	68.38	95.62		
CV.1se	0.27	0.05	0.03	48.97	0.54	
CV.min	9.01	0.9	0.19	84.28	8.51	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.15	42.39	56.52	22.08		$\rho = 0.5$
AIC	115.07	93.07	70.49	96.3		$Oracle$: 31.41
BIC	113.93	91.11	68.92	95.77		
CV.1se	0.42	0.06	0.04	48.42	0.53	
CV.min	9.6	0.98	0.26	81.83	9.33	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.76	41.57	56.68	21		$\rho = 0.9$
AIC	114.81	92.9	70.53	95.92		$Oracle$: 31
BIC	113.55	90.83	69.07	95.31		
CV.1se	0.24	0.02	0.04	49.59	0.45	
CV.min	6.35	0.36	0.19	84.57	6.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.92	48.6	58.18	20.96		$\rho = 0$
AIC	115.61	88.57	66.96	96.64		$Oracle$: 8.54
BIC	114.23	86.37	66.14	96.13		
CV.1se	0.05	0.03	0.01	49.54	0.44	
CV.min	5.77	0.4	0.17	83.22	5.16	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.98	48.24	58.18	20.31		$\rho = 0.5$
AIC	115.49	89.44	67.61	96.86		$Oracle$: 8.87
BIC	114.27	87.47	66.68	96.26		
CV.1se	0.18	0.02	0.02	46.56	0.39	
CV.min	6.85	0.36	0.17	80.99	6.62	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.24	47.74	58.33	20.57		$\rho = 0.9$
AIC	115.34	89.16	67.7	96.66		$Oracle$: 8.11
BIC	114.07	86.87	66.81	96.04		

Table 77: **Nonzero coefficients at n=100, binary design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	1.11	0.1	0.05	53.43	0.91	$\mathrm{sd}(\mu)/\sigma = 2$, $\rho = 0$, $Oracle$: 78.12
CV.min	14.36	1	0.29	84.81	16.14	
AICc	6.5	45.45	56.62	22.86		
AIC	114.51	90.73	68.48	95.75		
BIC	113.45	88.83	67.4	95.12		
CV.1se	0.56	0.1	0.04	52.87	0.6	$\mathrm{sd}(\mu)/\sigma = 2$, $\rho = 0.5$, $Oracle$: 77.79
CV.min	12.21	0.9	0.26	85.13	11.88	
AICc	6.6	44.09	56.53	22.42		
AIC	114.74	91.78	69.18	96.19		
BIC	113.45	89.75	67.9	95.57		
CV.1se	0.64	0.09	0.04	50.46	0.54	$\mathrm{sd}(\mu)/\sigma = 2$, $\rho = 0.9$, $Oracle$: 77.15
CV.min	12.02	0.88	0.24	83.31	12.45	
AICc	6.38	43.96	56.72	21.71		
AIC	114.76	91.76	69.19	95.71		
BIC	113.53	89.77	67.95	95.1		
CV.1se	0.41	0.05	0.02	51.4	0.57	$\mathrm{sd}(\mu)/\sigma = 1$, $\rho = 0$, $Oracle$: 38.01
CV.min	9.65	0.48	0.2	84.61	9.83	
AICc	5.79	47.88	57.85	21.65		
AIC	115.06	88.95	67.26	96.52		
BIC	113.92	86.81	66.33	95.9		
CV.1se	0.34	0.05	0.03	49.83	0.46	$\mathrm{sd}(\mu)/\sigma = 1$, $\rho = 0.5$, $Oracle$: 36.88
CV.min	7.97	0.57	0.16	83.96	8.55	
AICc	5.34	47.05	57.51	21.68		
AIC	115.16	89.52	67.85	96.67		
BIC	114.03	87.41	67	95.98		
CV.1se	0.39	0.03	0.03	47.22	0.55	$\mathrm{sd}(\mu)/\sigma = 1$, $\rho = 0.9$, $Oracle$: 37.12
CV.min	8.78	0.56	0.23	81.79	8.64	
AICc	5.61	46.79	57.81	21.13		
AIC	115.04	89.73	68.06	96.25		
BIC	113.7	87.74	67.02	95.4		
CV.1se	0.2	0.02	0.02	49.77	0.4	$\mathrm{sd}(\mu)/\sigma = 0.5$, $\rho = 0$, $Oracle$: 6.56
CV.min	5.81	0.28	0.13	84.14	5.79	
AICc	4.63	50.71	59.3	20.93		
AIC	115.53	84.84	65.39	96.71		
BIC	114.32	82.58	64.67	96.11		
CV.1se	0.13	0.03	0.01	49.55	0.47	$\mathrm{sd}(\mu)/\sigma = 0.5$, $\rho = 0.5$, $Oracle$: 6.85
CV.min	5.85	0.31	0.14	83.82	5.62	
AICc	4.95	50.11	58.96	20.32		
AIC	115.3	85.71	65.69	96.73		
BIC	114.2	83.42	64.91	96.1		
CV.1se	0.21	0.01	0.03	46.17	0.43	$\mathrm{sd}(\mu)/\sigma = 0.5$, $\rho = 0.9$, $Oracle$: 6.4
CV.min	6.48	0.31	0.15	81.45	6.37	
AICc	5.47	49.45	59.13	20.78		
AIC	115.3	85.99	65.81	96.51		
BIC	113.86	83.58	65.16	95.7		

Table 78: **Nonzero coefficients at n=100, binary design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.71	0.07	0.04	53.85	0.87	
CV.min	12.91	0.69	0.25	85.31	14.1	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	6.23	48.41	58.08	22.78		$\rho = 0$
AIC	114.65	87.76	66.3	96.1		$Oracle$: 91.18
BIC	113.48	85.63	65.6	95.42		
CV.1se	0.45	0.04	0.04	52.25	0.53	
CV.min	10.77	0.55	0.25	85.36	10.92	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	6.18	47.28	57.96	22.01		$\rho = 0.5$
AIC	114.85	88.49	66.77	96.21		$Oracle$: 90.76
BIC	113.71	86.45	65.87	95.66		
CV.1se	0.54	0.06	0.03	50.49	0.56	
CV.min	9.88	0.6	0.24	83.82	10.41	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	6.39	48.25	57.97	21.66		$\rho = 0.9$
AIC	114.67	88.17	66.93	95.97		$Oracle$: 90.33
BIC	113.42	85.92	66.01	95.25		
CV.1se	0.47	0.03	0.02	51.32	0.48	
CV.min	9.07	0.39	0.21	85.17	8.91	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.45	49.11	58.71	21.6		$\rho = 0$
AIC	115.24	85.63	65.62	96.59		$Oracle$: 41.56
BIC	114.08	83.57	64.94	96.04		
CV.1se	0.4	0.04	0.03	50.67	0.45	
CV.min	7.8	0.49	0.18	84.22	7.69	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.32	49.29	58.67	21.02		$\rho = 0.5$
AIC	115.28	86.49	65.74	96.41		$Oracle$: 41.26
BIC	114.05	84.25	65.01	95.97		
CV.1se	0.39	0.02	0.02	48.12	0.54	
CV.min	8.81	0.48	0.2	82.08	8.01	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.9	49.58	58.71	21.5		$\rho = 0.9$
AIC	114.88	86.34	66.1	96.19		$Oracle$: 40.75
BIC	113.58	83.96	65.35	95.67		
CV.1se	0.18	0.02	0.02	50.14	0.42	
CV.min	5.9	0.25	0.17	83.88	5.82	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.73	52.14	60.03	20.23		$\rho = 0$
AIC	115.4	81.59	64.13	96.8		$Oracle$: 5.09
BIC	114.27	79.24	63.4	96.05		
CV.1se	0.19	0.03	0.01	49.14	0.47	
CV.min	6.07	0.26	0.13	83.68	5.63	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.82	51.51	59.88	20.47		$\rho = 0.5$
AIC	115.43	82.47	64.43	96.7		$Oracle$: 5.6
BIC	114.34	79.92	63.69	96.1		
CV.1se	0.18	0.02	0.01	46.55	0.44	
CV.min	6.6	0.28	0.13	81.7	6.85	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.19	51.64	60.11	20.74		$\rho = 0.9$
AIC	115.45	82.32	64.49	96.47		$Oracle$: 5.19
BIC	114.16	79.52	63.78	95.85		

Table 79: **Nonzero coefficients at n=100, continuous design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	9.38	5.78	2.06	39.46	6.53	
CV.min	42.21	23.33	5.17	69.95	33	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	19.98	8.06	49.38	26.11		$\rho = 0$
AIC	109.18	96.34	74.39	86.92		$Oracle$: 20.75
BIC	107.66	94.99	72.97	79.99		
CV.1se	1.31	1.14	0.63	37.72	1.69	
CV.min	15.97	10.34	1.86	70.04	10.04	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	9.96	2.15	39.05	21.17		$\rho = 0.5$
AIC	110.04	99.51	79.33	88.83		$Oracle$: 20.43
BIC	108.73	98.46	78.26	76.73		
CV.1se	1.37	1.21	1.03	12.61	1.04	
CV.min	8.59	5.65	1.7	34.12	3.12	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	7.53	1.51	1.07	19.16		$\rho = 0.9$
AIC	103.15	92.8	73.37	55.58		$Oracle$: 18.27
BIC	83.55	83.5	72.64	3.55		
CV.1se	1.56	0.77	0.25	45.1	1.08	
CV.min	16.67	5.95	1.02	78.33	16.1	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	10.94	1.75	53.61	22.91		$\rho = 0$
AIC	113.1	97.55	75.58	93.22		$Oracle$: 14.43
BIC	111.76	96.18	74	91.6		
CV.1se	0.51	0.34	0.19	39.43	0.61	
CV.min	9.68	3.89	0.7	72.96	7.51	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.04	0.87	51.96	20.33		$\rho = 0.5$
AIC	113.8	100.8	80.71	93.59		$Oracle$: 14.19
BIC	112.15	99.36	78.76	90.59		
CV.1se	1.1	0.96	0.9	6.97	0.95	
CV.min	9	5.41	1.56	25.81	3.19	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.81	1.47	1.78	13.76		$\rho = 0.9$
AIC	107.62	95.04	76	74.16		$Oracle$: 11.62
BIC	105.62	94.71	75.15	4.18		
CV.1se	0.34	0.08	0.03	48.1	0.51	
CV.min	6.94	1.3	0.23	81.96	6.86	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.64	7.83	56.31	20.66		$\rho = 0$
AIC	115.31	95.89	73.5	96.41		$Oracle$: 7.87
BIC	114.09	94.57	71.52	95.81		
CV.1se	0.09	0.07	0.02	40.22	0.43	
CV.min	5.87	1.58	0.28	74.78	5.28	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.28	0.63	55.06	20.2		$\rho = 0.5$
AIC	115.46	99.36	78.25	96.17		$Oracle$: 7.65
BIC	113.7	97.86	76.13	95.21		
CV.1se	0.35	0.26	0.17	8.47	0.51	
CV.min	6.83	3.64	0.81	28.53	5.08	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	6.83	0.59	38.76	14.49		$\rho = 0.9$
AIC	114.01	97.56	79.03	90.1		$Oracle$: 5.53
BIC	113.06	97.15	78.01	33.12		

Table 80: **Nonzero coefficients at n=100, continuous design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	1.3	0.26	0.08	52	1.09	
CV.min	16.99	2.22	0.38	83.98	18.43	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	8.48	14.96	56.34	23.95		$\rho = 0$
AIC	113.97	93.61	70.8	94.96		$Oracle$: 57.19
BIC	112.86	92.01	69.16	94.19		
CV.1se	0.21	0.09	0.03	41.73	0.53	
CV.min	7.5	1.72	0.24	76.39	7.17	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.7	1.12	55.6	20.13		$\rho = 0.5$
AIC	115.07	98.4	77	96.2		$Oracle$: 56.98
BIC	113.5	96.83	74.87	95.46		
CV.1se	0.51	0.45	0.31	7.67	0.61	
CV.min	7.71	4.6	1.2	27.5	5.56	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	7.44	0.88	25.08	14.94		$\rho = 0.9$
AIC	112.43	96.94	78.26	87.64		$Oracle$: 54.95
BIC	111.37	96.52	77.03	24.07		
CV.1se	0.43	0.07	0.02	51.02	0.54	
CV.min	10.48	0.92	0.29	84.44	10.15	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.5	26.93	57.5	21.65		$\rho = 0$
AIC	114.66	92.06	69.78	96.07		$Oracle$: 30.65
BIC	113.67	90.44	68.37	95.48		
CV.1se	0.21	0.06	0.02	42.44	0.57	
CV.min	5.87	1.18	0.21	76.85	6.16	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.05	3.51	56.35	19.82		$\rho = 0.5$
AIC	115.47	96.49	74.99	96.32		$Oracle$: 30.42
BIC	113.77	94.61	72.98	95.56		
CV.1se	0.3	0.23	0.11	7.81	0.41	
CV.min	5.86	3.2	0.67	28.37	5.21	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.04	0.46	51.2	14.45		$\rho = 0.9$
AIC	114.45	97.04	78.89	91.88		$Oracle$: 27.66
BIC	113.37	96.51	77.61	42.4		
CV.1se	0.3	0.04	0.03	48.78	0.43	
CV.min	6.8	0.38	0.17	83.46	6.23	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.14	46.46	59.19	20.55		$\rho = 0$
AIC	115.51	88.58	66.99	96.71		$Oracle$: 8.65
BIC	114.39	86.71	65.95	96.09		
CV.1se	0.22	0.03	0.02	39.8	0.37	
CV.min	5.6	0.6	0.19	74.69	5.09	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.62	21.05	58.6	19.88		$\rho = 0.5$
AIC	115.61	93	71.18	96.54		$Oracle$: 8.5
BIC	114.2	91.07	69.67	95.76		
CV.1se	0.16	0.06	0.03	7.94	0.4	
CV.min	4.34	1.46	0.25	28.76	3.8	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.41	0.23	62.79	14.46		$\rho = 0.9$
AIC	116.02	94.45	77.16	94.19		$Oracle$: 7.26
BIC	114.99	93.78	75.88	58.47		

Table 81: **Nonzero coefficients at n=100, continuous design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.67	0.06	0.04	52.6	0.76	
CV.min	13.65	0.82	0.27	85.39	13.84	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	7.11	34.13	57.96	22.79		$\rho = 0$
AIC	114.54	90.7	68.26	95.72		$Oracle$: 77.53
BIC	113.41	88.92	67.22	95.01		
CV.1se	0.22	0.09	0.02	41.74	0.41	
CV.min	6.41	1.13	0.19	75.51	6.44	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	4.88	5.81	57.14	20.33		$\rho = 0.5$
AIC	115.39	96.11	73.86	96.26		$Oracle$: 77.53
BIC	113.81	94.16	71.99	95.3		
CV.1se	0.26	0.15	0.1	8.03	0.38	
CV.min	5.95	2.79	0.59	28.47	4.99	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.97	0.39	55.53	15.36		$\rho = 0.9$
AIC	114.85	96.86	78.52	92.57		$Oracle$: 76.01
BIC	113.69	96.21	77.41	45.46		
CV.1se	0.3	0.05	0.03	51.64	0.44	
CV.min	8.77	0.44	0.19	83.44	8.33	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.87	43.26	58.6	20.88		$\rho = 0$
AIC	115.09	89.05	67.39	96.38		$Oracle$: 37.66
BIC	114	87.23	66.38	95.79		
CV.1se	0.23	0.05	0.02	41.34	0.41	
CV.min	6.02	0.75	0.18	76.06	5.42	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	4.92	15.17	58.29	19.95		$\rho = 0.5$
AIC	115.57	94	72.01	96.38		$Oracle$: 37.21
BIC	113.99	92	70.37	95.56		
CV.1se	0.13	0.1	0.03	7.66	0.35	
CV.min	4.44	1.82	0.34	29.36	4.55	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	4.79	0.18	61.89	14.63		$\rho = 0.9$
AIC	115.68	95.57	77.87	93.94		$Oracle$: 34.56
BIC	114.84	94.91	76.41	53.27		
CV.1se	0.2	0.04	0.02	48.56	0.42	
CV.min	6.36	0.35	0.18	82.92	5.52	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.9	50.95	60.05	20.72		$\rho = 0$
AIC	115.38	84.92	65.25	96.58		$Oracle$: 6.81
BIC	114.25	82.92	64.42	95.97		
CV.1se	0.19	0.02	0.01	38.82	0.38	
CV.min	5.61	0.41	0.16	74.96	5.09	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.38	39.49	59.56	19.93		$\rho = 0.5$
AIC	115.44	89.9	68.67	96.71		$Oracle$: 6.7
BIC	113.88	87.92	67.64	95.92		
CV.1se	0.11	0.04	0.02	7.47	0.35	
CV.min	3.86	0.96	0.22	28.61	3.4	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.23	0.47	64.76	14.1		$\rho = 0.9$
AIC	116.35	91.88	75.83	94.49		$Oracle$: 6.45
BIC	115.4	91.01	74.37	57.59		

Table 82: **Nonzero coefficients at n=100, continuous design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.39	0.05	0.03	52.15	0.57	
CV.min	12.92	0.49	0.2	85.14	12.66	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	6.57	46.91	58.63	22.66		$\rho = 0$
AIC	114.72	87.92	66.31	96.21		$Oracle$: 91.12
BIC	113.53	85.95	65.55	95.64		
CV.1se	0.13	0.03	0.02	40.77	0.45	
CV.min	5.82	0.73	0.16	75.21	6.34	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.16	20.41	58.08	20.33		$\rho = 0.5$
AIC	115.38	92.81	70.86	96.34		$Oracle$: 91.12
BIC	113.65	90.95	69.43	95.54		
CV.1se	0.1	0.09	0.04	7.82	0.36	
CV.min	4.77	1.7	0.32	29	4.33	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	5.06	0.24	62.47	15.09		$\rho = 0.9$
AIC	115.24	94.82	77.08	93.74		$Oracle$: 90.49
BIC	114.18	94.19	75.55	54.71		
CV.1se	0.32	0.05	0.03	50.59	0.45	
CV.min	8.62	0.38	0.2	83.59	9.19	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	5.72	50.11	59.32	21.22		$\rho = 0$
AIC	114.97	85.8	65.3	96.45		$Oracle$: 41.19
BIC	113.95	83.48	64.34	95.88		
CV.1se	0.19	0.03	0.01	40.32	0.36	
CV.min	5.87	0.44	0.16	75.03	5.34	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	4.63	33.38	59.49	20.09		$\rho = 0.5$
AIC	115.52	90.77	69.29	96.41		$Oracle$: 41.33
BIC	113.74	88.77	68.06	95.73		
CV.1se	0.11	0.04	0.02	7.11	0.35	
CV.min	3.8	1.17	0.21	28.46	3.72	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	4.36	0.19	63.75	14.38		$\rho = 0.9$
AIC	115.83	92.95	76.28	94.55		$Oracle$: 39.92
BIC	114.57	92.2	74.93	58.59		
CV.1se	0.17	0.04	0.02	48.98	0.41	
CV.min	6.19	0.27	0.17	83.35	5.93	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.79	53.01	60.14	20.33		$\rho = 0$
AIC	115.2	81.51	64.03	96.69		$Oracle$: 5.4
BIC	114.26	79.22	63.24	96.1		
CV.1se	0.13	0.03	0.01	38.83	0.35	
CV.min	5.75	0.3	0.13	74.26	5.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.8	48.9	60.57	19.92		$\rho = 0.5$
AIC	115.71	86.57	66.78	96.49		$Oracle$: 5.46
BIC	113.99	84.52	65.89	95.65		
CV.1se	0.09	0.02	0.01	7.04	0.35	
CV.min	3.32	0.77	0.18	28.68	3.24	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.08	2.02	65.28	14.17		$\rho = 0.9$
AIC	116.06	89.46	74.33	94.64		$Oracle$: 5.28
BIC	115.1	88.47	72.94	58.05		

Table 83: **Nonzero coefficients at n=100, binary design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	15.26	10.62	4.77	34.95	9.61	
CV.min	51.8	31.21	10.08	63.72	26.46	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	23.67	17.33	47.63	27.06		$\rho = 0$
AIC	107.57	95.72	73.55	83.28		$Oracle: 10$
BIC	105.8	94.27	72.36	70.2		
CV.1se	13.29	9.46	3.97	37.88	9.27	
CV.min	49.64	31.3	9.03	66.79	25.74	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	22.91	17.68	48.1	27.48		$\rho = 0.5$
AIC	108.01	96.82	74.63	84.59		$Oracle: 10$
BIC	106.54	95.38	73.26	75.65		
CV.1se	12.9	9.51	3.65	37.95	9.13	
CV.min	49.97	31.29	8.63	66.12	25.43	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	22.52	17.48	47.23	27.33		$\rho = 0.9$
AIC	108.2	97.07	75.19	84.9		$Oracle: 10$
BIC	106.67	95.7	73.7	74.68		
CV.1se	2.24	1.32	0.37	44.25	1.8	
CV.min	22.92	8.52	1.58	76.86	20.44	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	12.31	10.3	52.27	23.99		$\rho = 0$
AIC	112.3	97.2	75.73	92.06		$Oracle: 10$
BIC	110.82	95.77	74.01	90.62		
CV.1se	1.87	0.97	0.4	45.65	1.34	
CV.min	20.75	8.04	1.29	78.54	17.03	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	11.25	9.71	51.62	23.01		$\rho = 0.5$
AIC	112.86	98.02	76.29	92.45		$Oracle: 10$
BIC	111.36	96.45	74.48	90.71		
CV.1se	2.07	0.91	0.36	43.34	1.56	
CV.min	20.36	8.18	1.35	75.11	17.3	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	11.44	9.29	51.97	23.82		$\rho = 0.9$
AIC	112.43	98.3	76.93	92.28		$Oracle: 10$
BIC	110.79	96.77	75.18	90.7		
CV.1se	0.3	0.05	0.03	48.68	0.51	
CV.min	7.54	1.43	0.26	81.23	7.13	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.83	26.06	54.48	21.04		$\rho = 0$
AIC	114.97	96.18	74.3	96.04		$Oracle: 10$
BIC	113.74	94.86	72.14	95.37		
CV.1se	0.18	0.07	0.03	48.41	0.53	
CV.min	7.54	1.3	0.27	82.65	6.92	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.72	23.47	54.59	21.12		$\rho = 0.5$
AIC	114.94	96.9	74.9	96.2		$Oracle: 10$
BIC	113.77	95.4	72.7	95.47		
CV.1se	0.46	0.08	0.05	46.13	0.56	
CV.min	7.85	1.39	0.33	80.29	7.45	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.61	21.6	54.19	21.05		$\rho = 0.9$
AIC	115.04	96.82	74.9	96.08		$Oracle: 10$
BIC	113.73	95.31	72.73	95.3		

Table 84: **Nonzero coefficients at n=100, binary design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	16.13	10.09	2.67	40.53	14.08	
CV.min	56.2	31.18	8.11	68.24	43.57	$\text{sd}(\mu)/\sigma = 2$
AICc	25.81	19.81	50.58	29.52		$\rho = 0$
AIC	109.45	94.74	71.57	86.29		$Oracle : 10$
BIC	107.59	93.14	70.12	81.32		
CV.1se	12.85	8.14	2.13	42.89	12.2	
CV.min	52.22	29.99	6.41	72.28	42.91	$\text{sd}(\mu)/\sigma = 2$
AICc	23.98	21.35	50.61	30.33		$\rho = 0.5$
AIC	110	95.56	72.79	88.07		$Oracle : 10$
BIC	108.16	93.96	71.14	85.1		
CV.1se	12.45	7.88	1.6	43.29	11.43	
CV.min	51.72	28.89	5.45	72.13	41.13	$\text{sd}(\mu)/\sigma = 2$
AICc	23.49	21.43	50.1	29.47		$\rho = 0.9$
AIC	109.97	95.94	73.2	88.1		$Oracle : 10$
BIC	108.29	94.27	71.58	84.75		
CV.1se	1.71	0.53	0.18	46.33	1.54	
CV.min	21.83	4.96	0.88	79.69	19.74	$\text{sd}(\mu)/\sigma = 1$
AICc	11.04	21.93	53.84	24.64		$\rho = 0$
AIC	113.3	95.24	72.79	93.32		$Oracle : 10$
BIC	111.88	93.85	71.27	92.44		
CV.1se	1.35	0.49	0.15	48.46	1.05	
CV.min	18.23	4.31	0.76	80.96	17.35	$\text{sd}(\mu)/\sigma = 1$
AICc	10.07	19.99	54.25	23.47		$\rho = 0.5$
AIC	113.55	96.07	74.08	93.89		$Oracle : 10$
BIC	112.04	94.68	72.11	93.01		
CV.1se	1.48	0.45	0.15	46.58	1.43	
CV.min	18.38	4.3	0.72	78.04	16.64	$\text{sd}(\mu)/\sigma = 1$
AICc	9.91	18.8	53.45	23.86		$\rho = 0.9$
AIC	113.5	96.56	74.22	93.69		$Oracle : 10$
BIC	112.07	94.87	72.43	92.51		
CV.1se	0.19	0.05	0.03	48.89	0.49	
CV.min	7.2	0.78	0.22	82.38	7.36	$\text{sd}(\mu)/\sigma = 0.5$
AICc	5.69	41.34	56.18	20.81		$\rho = 0$
AIC	115.05	93.33	71.05	96.19		$Oracle : 10$
BIC	113.79	91.61	69.48	95.57		
CV.1se	0.15	0.09	0.03	48.92	0.51	
CV.min	6.87	0.75	0.22	83.16	6.76	$\text{sd}(\mu)/\sigma = 0.5$
AICc	5.32	39.19	56.2	20.6		$\rho = 0.5$
AIC	115.1	93.86	71.59	96.49		$Oracle : 10$
BIC	113.89	92.23	69.58	95.72		
CV.1se	0.35	0.08	0.03	47.2	0.51	
CV.min	7.52	0.85	0.23	81.11	7.4	$\text{sd}(\mu)/\sigma = 0.5$
AICc	5.54	39.18	55.9	21.08		$\rho = 0.9$
AIC	115.04	94.12	71.57	96.28		$Oracle : 10$
BIC	113.72	92.32	70.03	95.6		

Table 85: **Nonzero coefficients at n=100, binary design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	16.25	9.9	2.56	40.8	13.89	
CV.min	56.12	30.29	7.09	68.19	43.91	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	25.92	20.1	50.87	29.8		$\rho = 0$
AIC	109.5	94.17	71.06	86.42		$Oracle : 10$
BIC	107.71	92.58	69.35	81.31		
CV.1se	12.66	7.82	1.83	43.08	12.63	
CV.min	51.74	29.5	5.79	72.42	45.16	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	23.93	21.36	51.14	30.35		$\rho = 0.5$
AIC	110.06	95.36	72.61	88.21		$Oracle : 10$
BIC	108.22	93.81	71.01	85.14		
CV.1se	12.13	7.54	1.57	43.65	11.08	
CV.min	51.24	27.8	5.46	72.44	42.37	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	23.51	22.16	50.82	29.91		$\rho = 0.9$
AIC	109.96	95.43	72.92	88.15		$Oracle : 10$
BIC	108.27	93.79	71.36	84.83		
CV.1se	1.67	0.54	0.17	46.44	1.52	
CV.min	21.94	4.62	0.85	79.58	19.81	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	11.21	25.15	54.4	24.47		$\rho = 0$
AIC	113.21	94.98	72.58	93.3		$Oracle : 10$
BIC	111.84	93.46	70.87	92.48		
CV.1se	1.31	0.46	0.16	48.53	1.11	
CV.min	17.75	3.93	0.74	81.02	17.72	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	9.99	22.08	53.71	23.21		$\rho = 0.5$
AIC	113.45	95.41	73.3	93.87		$Oracle : 10$
BIC	112.21	93.9	71.58	93.07		
CV.1se	1.48	0.44	0.15	46.94	1.36	
CV.min	18.39	4.36	0.68	78.06	16.65	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	9.9	20.73	54.31	23.77		$\rho = 0.9$
AIC	113.62	95.86	73.83	93.83		$Oracle : 10$
BIC	111.78	94.25	72.08	92.75		
CV.1se	0.2	0.05	0.03	48.94	0.51	
CV.min	7.25	0.85	0.24	82.54	7.42	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.58	42.66	56.7	20.93		$\rho = 0$
AIC	115.13	92.77	70.27	96.11		$Oracle : 10$
BIC	113.8	91.17	68.87	95.44		
CV.1se	0.13	0.06	0.03	48.89	0.47	
CV.min	7.36	0.71	0.23	82.88	6.72	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.47	40.99	56.27	20.73		$\rho = 0.5$
AIC	115.14	93.36	71.01	96.47		$Oracle : 10$
BIC	114.08	91.68	69.34	95.79		
CV.1se	0.31	0.06	0.03	46.93	0.54	
CV.min	7.5	0.77	0.22	80.97	7.4	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.59	40.25	56.13	21.02		$\rho = 0.9$
AIC	115.22	93.28	71.09	96.18		$Oracle : 10$
BIC	113.78	91.46	69.58	95.53		

Table 86: **Nonzero coefficients at n=100, binary design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	16.3	9.87	2.6	40.81	13.9	
CV.min	56.43	30.25	7.22	68.21	44.62	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	25.96	20.19	50.51	30.09		$\rho = 0$
AIC	109.46	94.02	70.89	86.51		$Oracle : 10$
BIC	107.7	92.34	69.24	81.5		
CV.1se	12.64	7.58	1.76	43.12	12.52	
CV.min	51.72	28.7	5.71	72.35	45.49	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	24.19	21.69	51.09	30.58		$\rho = 0.5$
AIC	109.97	95.16	72.22	88.27		$Oracle : 10$
BIC	108.2	93.63	70.63	85.32		
CV.1se	12.47	7.56	1.56	43.72	11.49	
CV.min	52.07	28.03	5.1	72.34	43.41	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	23.59	22.25	51.31	29.76		$\rho = 0.9$
AIC	110.06	95.27	72.43	88.19		$Oracle : 10$
BIC	108.38	93.75	70.8	85.2		
CV.1se	1.67	0.58	0.17	46.52	1.53	
CV.min	21.53	4.46	0.88	79.52	19.68	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	11.19	26.01	54.39	24.47		$\rho = 0$
AIC	113.26	94.75	72.32	93.32		$Oracle : 10$
BIC	111.88	92.98	70.66	92.52		
CV.1se	1.39	0.49	0.14	48.48	1.08	
CV.min	17.82	3.67	0.7	80.79	16.98	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	9.77	23.42	53.92	23.32		$\rho = 0.5$
AIC	113.55	95.31	73.21	93.9		$Oracle : 10$
BIC	112.09	93.71	71.35	93.02		
CV.1se	1.49	0.47	0.17	47.01	1.38	
CV.min	18.57	3.81	0.71	78.45	16.48	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	9.44	22.28	54.36	24.04		$\rho = 0.9$
AIC	113.62	95.64	73.58	93.83		$Oracle : 10$
BIC	112.03	93.96	72.05	92.8		
CV.1se	0.18	0.05	0.04	49.01	0.5	
CV.min	7.3	0.76	0.22	82.27	7.55	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.68	42.76	56.51	20.96		$\rho = 0$
AIC	115.05	92.49	70.28	96.17		$Oracle : 10$
BIC	113.84	90.98	68.77	95.54		
CV.1se	0.13	0.06	0.02	49.06	0.49	
CV.min	7.18	0.72	0.22	82.87	6.86	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.32	41.42	56.52	20.47		$\rho = 0.5$
AIC	115.25	93.32	70.79	96.45		$Oracle : 10$
BIC	113.97	91.47	69.17	95.78		
CV.1se	0.32	0.09	0.02	47.14	0.5	
CV.min	7.87	0.81	0.21	81.23	7.48	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.56	41.04	56.52	21.18		$\rho = 0.9$
AIC	115.32	93.22	70.92	96.26		$Oracle : 10$
BIC	113.95	91.52	69.54	95.46		

Table 87: **Nonzero coefficients at n=100, continuous design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	14.5	10.37	4.59	34.35	9.08	
CV.min	48.76	30.49	9.09	62.24	25.12	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	23.63	12.69	40.4	27.3		$\rho = 0$
AIC	107.21	95.86	73.11	82.84		$Oracle : 10$
BIC	105.59	94.62	71.98	68.72		
CV.1se	1.85	2.03	0.98	34.6	2.43	
CV.min	18.64	13.43	2.57	67.88	10.97	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	11.48	3.33	32.98	21.77		$\rho = 0.5$
AIC	108.62	99.01	78.58	86.94		$Oracle : 10$
BIC	107.48	98.11	77.47	69.36		
CV.1se	1.87	1.57	1.21	14.26	1.38	
CV.min	12.42	8.94	2.65	35.64	4.83	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	9.63	2.13	1.09	20.56		$\rho = 0.9$
AIC	103.72	94.2	74.92	59.68		$Oracle : 10$
BIC	96.42	91.4	74.17	4.16		
CV.1se	2.32	1.23	0.47	42.95	1.56	
CV.min	21.01	7.68	1.51	75.87	17.68	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	12.34	2.64	52.92	22.95		$\rho = 0$
AIC	112.42	97.36	75.51	91.96		$Oracle : 10$
BIC	110.69	96.1	73.51	89.39		
CV.1se	0.65	0.47	0.24	37.69	0.66	
CV.min	10.16	4.68	1	71.7	7.12	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	7.91	1.19	49.4	20.47		$\rho = 0.5$
AIC	112.63	100.66	80.45	92.43		$Oracle : 10$
BIC	110.97	99.28	79.02	88.18		
CV.1se	1.08	1.02	0.88	8.06	0.92	
CV.min	9.12	6.35	1.86	27.66	4.02	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	8.21	1.51	1.5	14.76		$\rho = 0.9$
AIC	108.8	96.79	77.68	77.15		$Oracle : 10$
BIC	107.12	96.28	76.8	6.57		
CV.1se	0.43	0.1	0.04	47.17	0.53	
CV.min	7.26	1.51	0.35	81.57	7.12	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	6.04	5.46	56.14	20.48		$\rho = 0$
AIC	114.91	96.23	74.15	96.17		$Oracle : 10$
BIC	113.8	95.08	71.87	95.47		
CV.1se	0.19	0.1	0.03	40.1	0.4	
CV.min	6.2	1.96	0.33	73.69	5.92	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.5	0.51	54.56	19.49		$\rho = 0.5$
AIC	115.31	99.61	78.56	95.89		$Oracle : 10$
BIC	113.74	98.17	76.53	94.87		
CV.1se	0.27	0.21	0.13	8.65	0.47	
CV.min	6.07	3.78	0.76	29.34	4.84	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	6.02	0.53	39.04	15.1		$\rho = 0.9$
AIC	114.26	98.77	79.84	91.25		$Oracle : 10$
BIC	113.21	98.28	78.81	40.59		

Table 88: **Nonzero coefficients at n=100, continuous design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	15.25	9.84	2.94	38.53	12.86	
CV.min	52.29	29.7	7.84	65.99	41.23	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	25.49	14.18	48.45	29.4		$\rho = 0$
AIC	108.91	94.44	71.11	85.89		$Oracle : 10$
BIC	107.15	93.03	69.96	79.75		
CV.1se	1.13	0.83	0.32	38.6	1.18	
CV.min	15.96	7.85	1.36	71.45	12.66	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	10.31	2.05	51.43	22.39		$\rho = 0.5$
AIC	111.75	99.46	78.84	91.86		$Oracle : 10$
BIC	110.21	98.12	77.3	88.77		
CV.1se	2.94	2.39	1.55	11.52	1.8	
CV.min	17.32	11.96	3.39	31.45	5.82	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	12.15	2.92	4.24	17.22		$\rho = 0.9$
AIC	110.52	98.92	79.39	82.52		$Oracle : 10$
BIC	109.06	98.51	78.52	16.99		
CV.1se	1.89	0.68	0.22	45.26	1.47	
CV.min	20.44	4.87	1	77.64	19.27	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	11.4	3.98	55.05	23.7		$\rho = 0$
AIC	112.93	95.4	72.56	93.21		$Oracle : 10$
BIC	111.49	93.86	71.14	92.01		
CV.1se	0.47	0.15	0.09	40.29	0.5	
CV.min	8.63	3.06	0.5	73.88	8.11	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.57	1.17	53.49	20.6		$\rho = 0.5$
AIC	114.17	99.81	78.69	94.66		$Oracle : 10$
BIC	112.51	98.2	76.7	92.95		
CV.1se	0.92	0.75	0.43	10.91	0.9	
CV.min	10.64	7.1	1.62	31.65	6.78	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	8.71	1.03	22.63	16.97		$\rho = 0.9$
AIC	113.45	99.75	80.37	89.73		$Oracle : 10$
BIC	112.3	99.31	79.27	36.91		
CV.1se	0.45	0.08	0.04	47.64	0.51	
CV.min	7.27	1.09	0.24	83.01	6.88	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.88	21.4	57.22	20.57		$\rho = 0$
AIC	115.22	93.22	70.71	96.37		$Oracle : 10$
BIC	113.89	91.61	69.19	95.75		
CV.1se	0.16	0.05	0.01	40.62	0.38	
CV.min	5.75	1.27	0.24	74.63	5.47	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.8	2.44	56.44	19.2		$\rho = 0.5$
AIC	115.48	97.16	75.46	96.22		$Oracle : 10$
BIC	113.75	95.41	73.34	95.56		
CV.1se	0.23	0.1	0.04	9.17	0.41	
CV.min	5.11	2.47	0.36	30.21	4.47	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.77	0.2	59.58	14.71		$\rho = 0.9$
AIC	115.51	97.78	79.39	93.86		$Oracle : 10$
BIC	114.51	97.09	77.93	56.05		

Table 89: **Nonzero coefficients at n=100, continuous design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	15.3	9.46	2.79	38.84	13.15	
CV.min	52.74	28.67	7.57	66.14	40.88	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	25.79	14.25	49.58	29.74		$\rho = 0$
AIC	109.07	94.06	70.86	85.87		$Oracle : 10$
BIC	107.23	92.67	69.57	80.39		
CV.1se	1.15	0.8	0.29	38.82	1.13	
CV.min	15.67	7.55	1.3	71.88	12.83	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	9.99	2.09	51.75	22.65		$\rho = 0.5$
AIC	111.92	99.41	78.36	92.07		$Oracle : 10$
BIC	110.3	97.87	76.79	88.34		
CV.1se	3.02	2.37	1.53	11.41	1.84	
CV.min	17.58	11.65	3.21	30.64	6.05	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	12.44	2.96	4.2	17.48		$\rho = 0.9$
AIC	111.28	99.27	79.3	84.13		$Oracle : 10$
BIC	110.01	98.5	78.44	19.56		
CV.1se	1.85	0.68	0.25	45.32	1.5	
CV.min	20.34	4.69	0.94	77.91	19.42	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	11.35	4.96	55.5	23.71		$\rho = 0$
AIC	112.88	94.53	72.26	93.26		$Oracle : 10$
BIC	111.39	93.22	70.86	92.15		
CV.1se	0.49	0.15	0.09	40.63	0.55	
CV.min	8.72	2.83	0.49	74.05	7.92	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.7	1.08	54.75	20.91		$\rho = 0.5$
AIC	114.18	99.19	78.32	94.66		$Oracle : 10$
BIC	112.37	97.6	76.47	93.35		
CV.1se	0.93	0.75	0.41	11.31	0.92	
CV.min	10.6	6.93	1.59	31.92	6.93	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	8.87	1	28.15	17.33		$\rho = 0.9$
AIC	113.67	99.58	80.42	90.31		$Oracle : 10$
BIC	112.6	98.96	79.3	38.44		
CV.1se	0.39	0.09	0.03	47.88	0.51	
CV.min	7.02	0.94	0.22	83.05	6.92	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	6.03	23.93	58.01	20.39		$\rho = 0$
AIC	115.14	92.72	70.33	96.45		$Oracle : 10$
BIC	113.9	91.32	68.77	95.84		
CV.1se	0.15	0.05	0.01	40.56	0.39	
CV.min	5.64	1.13	0.24	74.59	5.6	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.77	3.34	56.58	18.98		$\rho = 0.5$
AIC	115.38	96.69	74.79	96.22		$Oracle : 10$
BIC	113.88	95.01	72.91	95.49		
CV.1se	0.22	0.09	0.05	9.07	0.39	
CV.min	4.92	2.39	0.35	30.14	4.48	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.99	0.18	60.35	14.89		$\rho = 0.9$
AIC	115.45	97.52	79.08	94.04		$Oracle : 10$
BIC	114.32	96.92	77.76	56.09		

Table 90: **Nonzero coefficients at n=100, continuous design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	15.21	9.35	2.77	38.82	13.47	
CV.min	52.82	28.65	7.41	66.02	41.77	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	25.42	14.14	50.04	29.98		$\rho = 0$
AIC	109.08	93.8	70.69	85.97		$Oracle : 10$
BIC	107.32	92.37	69.39	80.36		
CV.1se	1.17	0.96	0.3	38.95	1.11	
CV.min	15.91	7.53	1.25	71.91	12.68	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	10.01	1.97	50.99	22.59		$\rho = 0.5$
AIC	111.92	99.13	78.16	92.24		$Oracle : 10$
BIC	110.31	97.63	76.44	88.11		
CV.1se	3.06	2.36	1.54	11.34	1.82	
CV.min	17.76	11.56	3.37	30.47	6.11	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	12.36	2.97	5.95	17.28		$\rho = 0.9$
AIC	111.5	99.3	79.39	84.64		$Oracle : 10$
BIC	110.17	98.8	78.55	21.46		
CV.1se	1.82	0.61	0.24	45.25	1.42	
CV.min	20.17	4.57	1.05	77.66	19.06	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	11.37	5.38	55.83	23.62		$\rho = 0$
AIC	112.97	94.51	71.98	93.3		$Oracle : 10$
BIC	111.61	93.11	70.39	91.94		
CV.1se	0.45	0.14	0.09	40.74	0.56	
CV.min	8.58	2.68	0.51	74.03	7.9	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	6.68	1.07	54.68	20.64		$\rho = 0.5$
AIC	114.12	99.09	78	94.62		$Oracle : 10$
BIC	112.63	97.48	75.92	93.32		
CV.1se	0.95	0.75	0.38	11.42	0.88	
CV.min	10.38	6.89	1.56	31.8	6.94	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	8.91	0.97	29.77	17.51		$\rho = 0.9$
AIC	113.75	99.3	80.23	90.54		$Oracle : 10$
BIC	112.62	98.61	78.95	40.24		
CV.1se	0.4	0.09	0.03	47.72	0.52	
CV.min	7.16	0.87	0.23	83.11	6.8	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	5.98	25.61	57.58	20.44		$\rho = 0$
AIC	115.19	92.21	69.93	96.41		$Oracle : 10$
BIC	114	90.72	68.56	95.8		
CV.1se	0.14	0.05	0.02	40.55	0.38	
CV.min	5.73	1.12	0.24	74.35	5.55	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.63	3.95	56.76	19.17		$\rho = 0.5$
AIC	115.4	96.71	74.93	96.33		$Oracle : 10$
BIC	113.69	95.06	72.93	95.62		
CV.1se	0.23	0.09	0.04	9.02	0.38	
CV.min	4.93	2.29	0.36	30.16	4.45	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	4.92	0.19	60.41	14.85		$\rho = 0.9$
AIC	115.49	97.2	79.11	94.12		$Oracle : 10$
BIC	114.44	96.64	77.64	54.99		

Table 91: **Nonzero coefficients at n=1000, binary design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	40.29	30.26	20.06	28.88	18.91	
CV.min	103.86	78.52	31.82	53.4	32.61	$\text{sd}(\mu)/\sigma = 2$
AICc	98.7	77.59	49.32	50.55		$\rho = 0$
AIC	610.28	607.78	579.95	51.89		$Oracle$: 33.33
BIC	30.26	26.24	20.04	25.37		
CV.1se	44.17	32.54	20.14	30.83	18.92	
CV.min	111.63	84.28	33.09	55.46	32.41	$\text{sd}(\mu)/\sigma = 2$
AICc	104.35	81.41	52.45	52.7		$\rho = 0.5$
AIC	610.41	607.82	581.21	53.96		$Oracle$: 33.31
BIC	30.89	26.5	20	25.76		
CV.1se	46.46	33.38	20.35	31.05	18.88	
CV.min	114.78	86.83	34.4	55.02	33.29	$\text{sd}(\mu)/\sigma = 2$
AICc	106.32	82.36	52.01	52.52		$\rho = 0.9$
AIC	603.04	600.74	573.89	53.5		$Oracle$: 33.07
BIC	31.48	26.8	19.88	26.37		
CV.1se	24.04	17.97	12.28	37.57	11.93	
CV.min	77.63	53.9	19.1	115.49	26.51	$\text{sd}(\mu)/\sigma = 1$
AICc	79.62	59.8	48.82	98.15		$\rho = 0$
AIC	741.05	735.09	706.78	151.85		$Oracle$: 26.34
BIC	19.81	16.69	11.64	18.04		
CV.1se	25.49	18.63	12.2	40.99	11.94	
CV.min	82.84	57.87	18.8	119.47	24.93	$\text{sd}(\mu)/\sigma = 1$
AICc	83.24	62.61	48.16	98.94		$\rho = 0.5$
AIC	742.59	736.48	708.61	158.24		$Oracle$: 26.43
BIC	19.78	16.56	11.67	18.13		
CV.1se	27.1	19.2	12.26	40.54	11.86	
CV.min	85.99	60.35	19.91	114.82	25.63	$\text{sd}(\mu)/\sigma = 1$
AICc	85.41	64.03	48.92	100.32		$\rho = 0.9$
AIC	736.9	730.77	702.45	151.49		$Oracle$: 26.14
BIC	19.93	16.69	11.48	18.45		
CV.1se	8.77	6.95	4.92	41.55	5.06	
CV.min	47.87	28.53	9.83	139.79	22.76	$\text{sd}(\mu)/\sigma = 0.5$
AICc	57.57	39.53	39.22	105.73		$\rho = 0$
AIC	829.32	820.64	811.42	314.03		$Oracle$: 19.71
BIC	8.92	7.28	3.28	10.28		
CV.1se	8.77	7	4.8	45.41	4.88	
CV.min	50.91	31.32	9.68	143.08	20.9	$\text{sd}(\mu)/\sigma = 0.5$
AICc	59.87	43.09	41.37	105.96		$\rho = 0.5$
AIC	831.55	823.04	812.95	319.27		$Oracle$: 19.37
BIC	8.23	6.88	3.21	9.9		
CV.1se	9.12	7.02	4.69	43.14	4.97	
CV.min	53.04	33.09	9.76	136.65	20.59	$\text{sd}(\mu)/\sigma = 0.5$
AICc	60.92	42.57	42.85	105.45		$\rho = 0.9$
AIC	827.65	819.44	809.05	303.68		$Oracle$: 19.73
BIC	8.01	6.63	3.13	9.99		

Table 92: **Nonzero coefficients at n=1000, binary design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	187.94	139.04	74.14	146.74	92.12	
CV.min	291.71	225.47	100.87	213.09	158.64	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	219.14	186.37	173.07	187.93		$\rho = 0$
AIC	746.18	738.06	708.24	255.23		$Oracle$: 124.19
BIC	93.41	79.6	59.12	85.74		
CV.1se	198.73	146.75	74.36	154.43	88.12	
CV.min	305.62	236.71	102.89	223.18	151.13	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	225.69	192.07	173.83	196.54		$\rho = 0.5$
AIC	751.72	743.47	714.42	268.57		$Oracle$: 123.77
BIC	91.97	79.48	58.92	86.63		
CV.1se	205.35	151.83	76.5	155.42	90.38	
CV.min	310.8	240.87	106.84	222.72	154.28	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	229.17	195.05	174.06	196.76		$\rho = 0.9$
AIC	748.26	740.18	711.04	267.17		$Oracle$: 123.58
BIC	93.14	79.97	59.82	88.14		
CV.1se	93.86	62.93	32.51	119.46	63.86	
CV.min	192.97	130.58	51.98	203.89	153.25	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	158.06	135.07	182.65	166.58		$\rho = 0$
AIC	824.28	813.34	804.09	356.82		$Oracle$: 90.22
BIC	24.33	27.67	10.73	40.98		
CV.1se	97.87	66	32.8	126.4	57.39	
CV.min	202.76	137.52	52.74	209.57	142.98	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	162.27	138.56	181.45	173.6		$\rho = 0.5$
AIC	827.91	817.81	807.78	371.71		$Oracle$: 90.23
BIC	17.21	24.66	10.35	38.9		
CV.1se	102.12	68.89	32.98	126.27	59.9	
CV.min	205.75	143.69	54.71	207.26	145.74	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	163.21	141.64	181.46	175.05		$\rho = 0.9$
AIC	825.37	814.97	803.91	365.56		$Oracle$: 89.22
BIC	15.59	23.61	9.46	38.24		
CV.1se	4.84	1.78	0.27	76.42	3.58	
CV.min	67.74	22.94	3.4	182.61	65.14	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	73.42	78.11	61.22	134.75		$\rho = 0$
AIC	873.7	862.77	873.73	462.82		$Oracle$: 56.16
BIC	0.44	0.51	0	2.68		
CV.1se	3.35	1.25	0.14	79.35	2.72	
CV.min	61.22	21.26	2.7	184.1	58.35	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	69.75	75.45	78.41	136.51		$\rho = 0.5$
AIC	874.96	864.43	874.21	477.01		$Oracle$: 56.21
BIC	0.27	0.29	0	2.05		
CV.1se	3.16	1.02	0.17	76.28	1.82	
CV.min	62.94	22.13	2.83	179.17	59.51	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	71.97	76.23	66.45	134.42		$\rho = 0.9$
AIC	872.69	862.02	872.35	471.88		$Oracle$: 56.5
BIC	0.27	0.33	0	1.82		

Table 93: **Nonzero coefficients at n=1000, binary design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	294.74	224.66	128.15	228	238.61	
CV.min	408.34	325.49	175.48	300.71	364.97	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	283.24	251.72	253.6	252.77		$\rho = 0$
AIC	788.18	776.49	752.2	369.07		$Oracle$: 208.71
BIC	46.61	87.42	98.48	108.5		
CV.1se	305.57	235.05	129.77	235.3	226.11	
CV.min	421.3	339.42	181.28	308.14	350.87	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	289.92	258.65	252.81	259.51		$\rho = 0.5$
AIC	792.48	780.96	756.95	381.33		$Oracle$: 208.79
BIC	22.87	81.48	100.23	103.41		
CV.1se	311.09	238.15	134.29	234.09	232	
CV.min	425.03	341.01	187.11	307.37	356.24	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	291.91	259.85	252.12	258.04		$\rho = 0.9$
AIC	790.06	779.16	754.31	381.4		$Oracle$: 209.43
BIC	17.89	78.71	103.31	100.59		
CV.1se	117.97	66.72	16.48	162.68	114	
CV.min	242.29	150.86	44.91	252.26	244.73	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	180.21	169.95	232.87	199.96		$\rho = 0$
AIC	845.94	833.3	832.89	447.23		$Oracle$: 143.25
BIC	0.76	2.67	0.19	13.48		
CV.1se	115.95	65.9	13.95	167.65	110.69	
CV.min	248.62	157.09	41.49	256.44	248.62	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	180.51	173.18	234.91	204.3		$\rho = 0.5$
AIC	848.75	836.24	834.17	457.89		$Oracle$: 144
BIC	0.66	1.65	0.03	9.28		
CV.1se	118.78	69.51	12.47	166.55	110.96	
CV.min	251.2	160.55	41.95	252.97	249.02	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	179.73	174.42	236.68	205.2		$\rho = 0.9$
AIC	846.39	833.79	831.4	457.58		$Oracle$: 143.6
BIC	0.45	1.24	0.13	8.69		
CV.1se	1.75	0.14	0.03	81.17	1.44	
CV.min	50.5	7.13	1.01	194.17	52.22	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	61.46	92.2	42.85	137.24		$\rho = 0$
AIC	881.85	869.79	887.57	510.94		$Oracle$: 77.92
BIC	0.11	0.05	0	0.89		
CV.1se	1.26	0.12	0.02	82.25	1.08	
CV.min	41.82	6.08	0.75	193.11	39.59	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	53.43	85.17	50.76	138.06		$\rho = 0.5$
AIC	882.18	871.13	887.71	523.07		$Oracle$: 78.04
BIC	0.08	0.04	0	0.8		
CV.1se	0.77	0.12	0.01	77.97	0.72	
CV.min	40.83	5.28	0.77	188.83	39.76	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	54.18	85.55	46.09	134.93		$\rho = 0.9$
AIC	880.12	868.15	885.31	516.08		$Oracle$: 77.5
BIC	0.1	0.06	0	0.69		

Table 94: **Nonzero coefficients at n=1000, binary design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	383.94	283.47	150.44	298.63	405.93	
CV.min	511.85	408.4	245.72	379.06	544.93	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	309.75	297.8	336.43	300.16		$\rho = 0$
AIC	821.08	804.86	787.57	470.44		$Oracle$: 293.07
BIC	0.35	1.58	98.03	13.45		
CV.1se	386.54	288.5	148.59	299.91	407.31	
CV.min	519.75	416.18	245.95	379.94	555.02	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	308.44	301.81	337.2	301.94		$\rho = 0.5$
AIC	825.11	809.5	790.08	477.91		$Oracle$: 293.71
BIC	0.33	0.69	81.75	8.08		
CV.1se	394	292.04	145.63	296.62	412.44	
CV.min	524.47	420.01	245.65	378.06	560.97	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	310.24	301.48	337.78	297.73		$\rho = 0.9$
AIC	822.44	806.85	788.27	478.03		$Oracle$: 293.26
BIC	0.31	0.75	77.53	6.91		
CV.1se	99.77	23.82	0.51	186.02	105.59	
CV.min	259.46	100.91	5.01	285.17	263.4	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	167.62	192.74	279.62	211.05		$\rho = 0$
AIC	859.47	844.17	852.09	513.5		$Oracle$: 216.99
BIC	0.17	0.12	0	2.08		
CV.1se	82.81	14.43	0.27	187.17	85.67	
CV.min	249.8	85.88	3.7	286.65	254.83	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	156.61	191.14	283.4	211.14		$\rho = 0.5$
AIC	861.78	846.79	852.79	520.13		$Oracle$: 214.81
BIC	0.14	0.12	0	1.62		
CV.1se	82.72	16.1	0.28	181.5	83.58	
CV.min	249.18	91.76	3.45	279.84	253.07	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	158.92	189.29	279.88	210.19		$\rho = 0.9$
AIC	859.39	844.07	850.26	519.86		$Oracle$: 215.03
BIC	0.14	0.08	0	1.45		
CV.1se	0.7	0.01	0.01	81.98	0.76	
CV.min	36.36	2.03	0.47	198.47	36.68	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	46.73	112.57	22.42	139.26		$\rho = 0$
AIC	885.63	873.54	896.81	537.14		$Oracle$: 90.72
BIC	0.07	0.01	23.29	0.52		
CV.1se	0.69	0.02	0	80.73	0.67	
CV.min	29.29	1.66	0.39	197.07	27.85	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	37.82	101.97	23.89	138.07		$\rho = 0.5$
AIC	885.94	874.09	896.62	543		$Oracle$: 91.39
BIC	0.05	0.01	5.37	0.42		
CV.1se	0.18	0.01	0.01	74.07	0.56	
CV.min	27.58	1.41	0.33	189.77	25.25	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	38.09	99.59	23.41	134.13		$\rho = 0.9$
AIC	883.15	871.17	893.98	538.49		$Oracle$: 89.48
BIC	0.06	0.01	6.28	0.45		

Table 95: **Nonzero coefficients at n=1000, continuous design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	40.23	30.77	20.09	29.14	18.78	
CV.min	103.76	78.8	31.81	53.81	32.47	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	98.46	71.29	25.58	50.62		$\rho = 0$
AIC	609.88	607.64	580.35	51.92		$Oracle$: 33.25
BIC	30.07	25.32	18.57	25.45		
CV.1se	85.95	59.01	22.88	35.13	18.98	
CV.min	173.58	132.96	51.72	45.41	30.13	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	146.22	111.74	45.27	45.18		$\rho = 0.5$
AIC	539.76	539.6	515.24	45.28		$Oracle$: 32.89
BIC	39.09	29.4	16.72	34.08		
CV.1se	150.02	120.25	60.25	11.45	32.54	
CV.min	226.55	191.62	98.54	12.54	58.04	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	190.68	160.9	82.9	12.54		$\rho = 0.9$
AIC	243	239.05	197.57	12.54		$Oracle$: 30.44
BIC	71.07	57.39	20.73	12.46		
CV.1se	24.05	18.18	12.51	38.68	11.99	
CV.min	77.57	53.9	19.19	117.71	25.94	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	79.04	49.77	13.8	97.49		$\rho = 0$
AIC	741.44	735.3	707.14	154.26		$Oracle$: 26.18
BIC	19.89	15.73	10.19	18.04		
CV.1se	45.8	31.51	12.76	65.94	12.36	
CV.min	125.9	93.68	28.08	125.17	23.86	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	115.44	82.27	24.26	112.66		$\rho = 0.5$
AIC	688.78	684	652.99	129.65		$Oracle$: 25.84
BIC	19.86	15.23	8.09	24.1		
CV.1se	62.36	64.82	38.31	15.39	24.64	
CV.min	158.96	137.62	66.45	26.62	50.78	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	141.65	114.83	50.41	26.15		$\rho = 0.9$
AIC	377.88	388.6	358.26	26.24		$Oracle$: 23.28
BIC	1.36	1.04	1.11	15.95		
CV.1se	8.8	7	4.92	44.83	5.08	
CV.min	48.52	28.86	9.74	141.58	21.95	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	56.72	24.17	4.06	106.35		$\rho = 0$
AIC	829.75	821.38	811.62	313.25		$Oracle$: 19.21
BIC	8.98	6.23	1.63	10.14		
CV.1se	4.39	5.4	3.2	52.64	5.18	
CV.min	56.57	45.85	11.03	139.38	16.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	66.87	38.72	2.97	114.28		$\rho = 0.5$
AIC	798.28	790.49	773.39	252.81		$Oracle$: 18.97
BIC	2.44	1.77	0.96	3.45		
CV.1se	1.01	1	1	12.12	1.22	
CV.min	6.89	5.06	2.4	56.98	10.16	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	12.86	1.84	1	55.73		$\rho = 0.9$
AIC	533.45	552.92	519.96	64.96		$Oracle$: 16.45
BIC	1.36	1.03	1	2.65		

Table 96: **Nonzero coefficients at n=1000, continuous design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	189.31	139.46	73.87	147.15	91	
CV.min	294.18	225.93	100.33	214.59	157.98	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	219.73	179.51	129.5	189.09		$\rho = 0$
AIC	744.98	736.27	707.21	254.54		$Oracle$: 122.78
BIC	92.2	75.5	52.55	86.25		
CV.1se	286.64	223.7	103.06	201.21	92.9	
CV.min	396.96	324.17	154.11	258.04	140.39	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	282.54	240.41	163.36	234.93		$\rho = 0.5$
AIC	725.19	717.34	686.23	275.34		$Oracle$: 122.51
BIC	47.23	75.62	59.96	85.34		
CV.1se	343.32	289.56	174.1	48.16	139.93	
CV.min	433.1	383.15	223.99	63.04	179.43	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	321.61	289.37	208.99	62.33		$\rho = 0.9$
AIC	439.84	423.48	377.82	62.64		$Oracle$: 119.51
BIC	1.5	1.05	1.75	32.92		
CV.1se	94.13	62.87	32.34	120.57	63.43	
CV.min	194.28	130.79	51.03	205.17	151.64	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	156.58	120.05	91.37	165.97		$\rho = 0$
AIC	823.94	812.81	803.32	357		$Oracle$: 90.22
BIC	24.13	21.07	1.31	40.85		
CV.1se	110.61	97.57	41.36	149.28	57.1	
CV.min	247.13	199.81	77.33	228.2	106.15	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	185.73	162.71	130.64	196.87		$\rho = 0.5$
AIC	813.03	804.22	788.13	382.78		$Oracle$: 89.65
BIC	1.29	0.9	0.12	4.35		
CV.1se	13.2	38.87	28.91	46.86	86.02	
CV.min	91.69	148.19	77.18	90.96	136.18	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	66.79	54.07	51.49	87.81		$\rho = 0.9$
AIC	567.7	553.16	511.68	94.55		$Oracle$: 86.22
BIC	1.45	1.05	1	3.31		
CV.1se	4.79	1.67	0.21	79.02	3.63	
CV.min	66.4	24.39	3.5	183.81	65.76	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	72.26	28.51	0.32	135.4		$\rho = 0$
AIC	872.68	861.48	872.95	464.25		$Oracle$: 55.94
BIC	0.38	0.09	0	2.63		
CV.1se	0.13	0.05	0.01	42.91	0.5	
CV.min	14.64	7.21	0.83	146.94	13.54	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	30.47	3.29	0.45	112.22		$\rho = 0.5$
AIC	865.25	855.61	859.09	477.54		$Oracle$: 55.62
BIC	0.16	0.07	0	0.66		
CV.1se	0.17	0.19	0.27	3.57	0.45	
CV.min	7.51	4.62	1.39	50.23	2.88	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	12.82	1.48	0.93	56.12		$\rho = 0.9$
AIC	694.36	675.13	662.68	99.31		$Oracle$: 52.3
BIC	1.3	1.01	0.72	1.48		

Table 97: **Nonzero coefficients at n=1000, continuous design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	295.67	224.76	126.9	227.98	237.94	
CV.min	409.33	324.61	174.62	300.53	365.75	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	283.83	244.32	221.26	252.41		$\rho = 0$
AIC	787.27	775.72	750.87	367.77		$Oracle$: 209.76
BIC	48.51	76.81	94.48	108.98		
CV.1se	381.43	313.85	185.07	258.75	183.17	
CV.min	502.88	427.02	253.3	342.89	238.47	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	326.77	300.72	247.32	282.31		$\rho = 0.5$
AIC	785.69	775.73	749.02	411.89		$Oracle$: 209.36
BIC	0.79	0.54	34.18	3.68		
CV.1se	424.02	368.39	247.85	61.94	209.98	
CV.min	534.23	478.03	314.91	110.51	258.8	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	346.23	340.85	289.79	106.08		$\rho = 0.9$
AIC	549.23	528.48	478.09	114.49		$Oracle$: 205.71
BIC	1.48	1.05	1	2.21		
CV.1se	118.11	65.7	17.56	164.9	113.82	
CV.min	245.02	151.66	45.64	252.48	245.91	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	179.45	152.77	172.19	199.51		$\rho = 0$
AIC	845.22	832.26	831.89	447.16		$Oracle$: 143.47
BIC	0.88	0.61	0.02	14.12		
CV.1se	22.33	21.53	0.62	140.9	25.15	
CV.min	175.27	122.49	6.11	241.24	130.73	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	123.73	133.25	175.33	191.04		$\rho = 0.5$
AIC	843.24	832.53	824.17	488.75		$Oracle$: 143.47
BIC	0.29	0.12	0	1.27		
CV.1se	0.66	0.68	0.53	21.21	2.22	
CV.min	9.09	8.97	1.55	88.13	14.64	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	16.5	1.8	1.58	92.84		$\rho = 0.9$
AIC	648.45	629.05	596.25	147.76		$Oracle$: 139.45
BIC	1.46	1.04	0.96	1.54		
CV.1se	1.41	0.22	0.01	84.18	1.24	
CV.min	50.87	7.05	0.99	194.69	51.01	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	60.65	15.8	0.77	139.02		$\rho = 0$
AIC	880.93	869.36	887.1	513.59		$Oracle$: 77.65
BIC	0.09	0.01	72.43	0.91		
CV.1se	0.03	0.01	0	33.29	0.46	
CV.min	9.02	2.35	0.31	135.51	9.12	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	20.81	0.5	0.54	101.99		$\rho = 0.5$
AIC	871.52	859.96	871.15	515.82		$Oracle$: 77.66
BIC	0.06	0.01	0	0.35		
CV.1se	0.03	0.04	0.05	0.93	0.44	
CV.min	6.97	4.16	1.25	33.26	4.64	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	12.79	1.19	0.34	37.12		$\rho = 0.9$
AIC	746.35	724.68	727.14	91.97		$Oracle$: 73.55
BIC	0.72	0.56	0.09	1.17		

Table 98: **Nonzero coefficients at n=1000, continuous design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	387.27	282.37	148.34	299.09	405.88	
CV.min	514.87	409.51	243.47	379.2	546.18	$\text{sd}(\mu)/\sigma = 2$
AICc	308.96	290.14	321.3	300.18		$\rho = 0$
AIC	820.4	803.49	785.31	467.88		$Oracle$: 293.21
BIC	0.4	0.13	239.99	13.26		
CV.1se	362.56	272.47	21.94	237.95	337.59	
CV.min	545.77	453.54	80.12	341.17	570.23	$\text{sd}(\mu)/\sigma = 2$
AICc	206.92	294.14	346.83	258.82		$\rho = 0.5$
AIC	825.52	811.79	789.99	506.01		$Oracle$: 293.08
BIC	0.18	0.06	11.17	1.12		
CV.1se	138.52	113.35	1.64	26.09	58.83	
CV.min	367.65	299.18	8.68	108.77	236.57	$\text{sd}(\mu)/\sigma = 2$
AICc	21.03	49.19	373.04	108.62		$\rho = 0.9$
AIC	655.08	630.68	585.9	205.08		$Oracle$: 292.24
BIC	1.43	1.02	0.83	1.57		
CV.1se	100.97	21.71	0.46	188.19	103.56	
CV.min	262.26	97.96	5.38	285.37	264.16	$\text{sd}(\mu)/\sigma = 1$
AICc	164.94	172.26	167.66	211.65		$\rho = 0$
AIC	859.08	842.76	851.85	513.31		$Oracle$: 215.38
BIC	0.21	0.02	57.73	2.33		
CV.1se	1.16	0.22	0.01	100.15	0.94	
CV.min	43.6	11.7	0.7	220.4	43.56	$\text{sd}(\mu)/\sigma = 1$
AICc	50.78	20.82	92.93	157.62		$\rho = 0.5$
AIC	856.8	842.84	841.34	536.23		$Oracle$: 215.2
BIC	0.09	0.02	0	0.49		
CV.1se	0.08	0.06	0.12	2.54	0.43	
CV.min	8.94	5.47	1.44	47.71	5.17	$\text{sd}(\mu)/\sigma = 1$
AICc	15.13	1.57	0.61	55.82		$\rho = 0.9$
AIC	719.38	695.56	676.52	227.69		$Oracle$: 211.72
BIC	1.02	0.78	0.29	1.44		
CV.1se	0.54	0.02	0.01	84.71	0.61	
CV.min	36.97	1.99	0.41	199.88	34.32	$\text{sd}(\mu)/\sigma = 0.5$
AICc	46.82	11.92	0	138.77		$\rho = 0$
AIC	885.04	873.33	897.03	543		$Oracle$: 91.35
BIC	0.07	0	630.51	0.52		
CV.1se	0.02	0	0	29.41	0.44	
CV.min	7.32	1.13	0.21	130.17	7.21	$\text{sd}(\mu)/\sigma = 0.5$
AICc	17.58	0.3	0	98.87		$\rho = 0.5$
AIC	872.97	860.48	877.79	531.04		$Oracle$: 90.94
BIC	0.05	0	16.53	0.3		
CV.1se	0.01	0.01	0.01	0.7	0.43	
CV.min	5.43	2.73	0.68	30.47	4.77	$\text{sd}(\mu)/\sigma = 0.5$
AICc	11.34	0.51	0.04	32.27		$\rho = 0.9$
AIC	778.52	754.45	769.48	99.03		$Oracle$: 87.01
BIC	0.19	0.11	0	0.57		

Table 99: **Nonzero coefficients at n=1000, binary design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	40.31	30.25	20.05	28.86	18.91	
CV.min	104.08	78.72	31.83	53.45	32.56	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	98.98	77.6	49.53	50.58		$\rho = 0$
AIC	610.24	607.85	580.06	51.93		$Oracle : 100$
BIC	30.26	26.27	20.03	25.44		
CV.1se	44.05	32.41	20.14	30.74	18.92	
CV.min	111.63	84.08	33.12	55.42	32.39	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	104.11	81.17	52.37	52.6		$\rho = 0.5$
AIC	610.47	607.84	581.21	53.89		$Oracle : 100$
BIC	30.88	26.52	19.98	25.81		
CV.1se	46.51	33.25	20.37	30.94	18.89	
CV.min	114.65	86.73	34.43	54.94	33.32	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	106.36	82.32	52.09	52.42		$\rho = 0.9$
AIC	603.01	600.65	573.87	53.42		$Oracle : 100$
BIC	31.45	26.79	19.89	26.34		
CV.1se	24.12	18	12.28	37.66	11.93	
CV.min	77.65	53.99	19.18	115.31	26.75	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	79.7	60.07	48.95	98.08		$\rho = 0$
AIC	740.95	735.1	706.81	151.88		$Oracle : 100$
BIC	19.82	16.68	11.65	18.05		
CV.1se	25.48	18.62	12.19	40.73	11.94	
CV.min	82.88	57.91	18.81	119.38	24.97	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	83.27	62.65	48.1	99		$\rho = 0.5$
AIC	742.55	736.42	708.63	158.35		$Oracle : 100$
BIC	19.8	16.57	11.68	18.14		
CV.1se	27.06	19.2	12.25	40.53	11.86	
CV.min	85.96	60.33	19.87	114.79	25.6	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	85.49	64.06	48.59	100.28		$\rho = 0.9$
AIC	737.07	730.88	702.58	151.4		$Oracle : 100$
BIC	19.91	16.68	11.48	18.43		
CV.1se	8.8	6.95	4.91	41.65	5.07	
CV.min	47.95	28.46	9.81	139.88	22.67	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	57.78	39.55	38.41	105.62		$\rho = 0$
AIC	829.25	820.55	811.29	314.29		$Oracle : 100$
BIC	8.95	7.28	3.27	10.28		
CV.1se	8.74	6.96	4.82	45.44	4.89	
CV.min	50.7	31.3	9.68	143.2	20.67	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	59.86	42.8	41.65	105.83		$\rho = 0.5$
AIC	831.69	823.13	813.1	319.72		$Oracle : 100$
BIC	8.24	6.9	3.23	9.92		
CV.1se	9.09	6.99	4.67	42.87	4.94	
CV.min	52.97	32.97	9.71	136.41	20.61	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	60.81	42.54	42.61	105.16		$\rho = 0.9$
AIC	827.67	819.49	808.99	303.88		$Oracle : 100$
BIC	7.99	6.61	3.12	9.98		

Table 100: **Nonzero coefficients at n=1000, binary design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	175.43	131.08	74.19	139.5	83.2	
CV.min	273.32	210.69	97.36	202.52	140	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	212.68	178.18	151.76	181.73		$\rho = 0$
AIC	742.41	733.99	705	242.57		$Oracle$: 100
BIC	96.16	82.53	61.51	87.36		
CV.1se	188.41	140.01	74.22	147.32	81.29	
CV.min	289.76	221.83	99.21	213.1	134.08	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	219.83	186.01	157.36	189.56		$\rho = 0.5$
AIC	747.09	739.6	711.53	257.5		$Oracle$: 100
BIC	96.13	82.15	61.47	87.16		
CV.1se	194.84	144.12	76.4	148.48	84.21	
CV.min	294.36	226.66	103.29	212.98	137.41	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	224.82	188.63	156.12	190.14		$\rho = 0.9$
AIC	744.2	736.1	707.58	256.68		$Oracle$: 100
BIC	98.35	83.67	62.07	89.85		
CV.1se	92.82	63.09	33.42	116.47	61.88	
CV.min	189.27	129.13	52.46	199.8	146.01	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	156.92	133.8	177.89	165.06		$\rho = 0$
AIC	822.82	812.25	802.46	349.39		$Oracle$: 100
BIC	27.09	29.39	12.51	42.5		
CV.1se	97.71	66.33	34.01	123.65	56.4	
CV.min	200.44	136.59	53.86	206.79	135.58	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	160.48	137.61	178.76	171.72		$\rho = 0.5$
AIC	826.98	816.89	806.41	366.05		$Oracle$: 100
BIC	20.09	26.68	12.12	40.6		
CV.1se	101.85	69.13	34.08	124.03	58.66	
CV.min	203.2	142.1	54.92	203.48	139.78	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	161.88	139.63	170.51	170.88		$\rho = 0.9$
AIC	824.07	813.66	803.39	359.09		$Oracle$: 100
BIC	18.13	25.73	11.32	40.25		
CV.1se	5.14	1.94	0.32	75.75	3.89	
CV.min	68.01	23.77	3.63	181.1	65.78	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	73.78	78.02	58.36	134.92		$\rho = 0$
AIC	873.17	862.19	872.83	460.57		$Oracle$: 100
BIC	0.42	0.54	0	2.88		
CV.1se	3.73	1.4	0.22	79.67	2.83	
CV.min	62.83	22.25	2.8	184.49	60.13	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	71.13	76.14	77.37	136.84		$\rho = 0.5$
AIC	874.64	863.95	873.95	476.73		$Oracle$: 100
BIC	0.32	0.31	0	2.06		
CV.1se	3.54	1.18	0.2	75.93	2.03	
CV.min	64.88	23.58	3.04	178.4	60.99	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	72.02	78.07	69.22	134.39		$\rho = 0.9$
AIC	872.43	861.77	871.47	470.23		$Oracle$: 100
BIC	0.32	0.36	0	2		

Table 101: **Nonzero coefficients at n=1000, binary design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	215.4	157.96	101.28	173.47	101.32	
CV.min	309.72	229.02	117.87	231.36	130.33	$\text{sd}(\mu)/\sigma = 2$
AICc	237.05	193.49	141.41	206.89		$\rho = 0$
AIC	768.26	758.21	735.21	298.73		$Oracle : 100$
BIC	134.84	115.96	90.19	124.51		
CV.1se	231.16	169.53	103.44	185.96	103.13	
CV.min	328.69	242.85	120.28	246.37	127.02	$\text{sd}(\mu)/\sigma = 2$
AICc	249.65	202.7	145.94	218.38		$\rho = 0.5$
AIC	772.58	763.08	739.67	313.69		$Oracle : 100$
BIC	139.79	120.25	92.05	128.5		
CV.1se	237.69	173.96	105.44	187.29	107.38	
CV.min	332.46	247.39	124.42	246.92	131.25	$\text{sd}(\mu)/\sigma = 2$
AICc	251.99	205.79	146.88	219.8		$\rho = 0.9$
AIC	769.94	760.51	737.48	314.21		$Oracle : 100$
BIC	141.89	122.11	92.61	130.1		
CV.1se	119.45	79.11	35.38	148.1	108.55	
CV.min	228.04	153.54	64.93	229.09	220.12	$\text{sd}(\mu)/\sigma = 1$
AICc	181.78	160.48	201.95	189		$\rho = 0$
AIC	839.55	827.34	826	408.19		$Oracle : 100$
BIC	1.65	10.06	1.15	31.29		
CV.1se	123.87	82.92	34.86	155.56	107.96	
CV.min	239.32	163.23	67.23	237.8	225.34	$\text{sd}(\mu)/\sigma = 1$
AICc	186.12	166.46	203.71	194.05		$\rho = 0.5$
AIC	842.41	831.19	827.35	420.37		$Oracle : 100$
BIC	1.13	5.19	0.59	22.8		
CV.1se	129.01	85.92	34.2	155.18	109.89	
CV.min	243.13	167.63	66.68	233.79	226.19	$\text{sd}(\mu)/\sigma = 1$
AICc	187.36	169.38	204.68	196.69		$\rho = 0.9$
AIC	840	828.47	824.8	420.29		$Oracle : 100$
BIC	0.91	4.39	0.79	19.91		
CV.1se	2.57	0.43	0.05	80.47	2.17	
CV.min	59.44	10.68	1.48	189.97	58.18	$\text{sd}(\mu)/\sigma = 0.5$
AICc	66.39	89.24	43.93	139.2		$\rho = 0$
AIC	879.35	868.09	884.4	496.45		$Oracle : 100$
BIC	0.15	0.08	0	1.19		
CV.1se	1.88	0.18	0.02	82.72	1.39	
CV.min	50.8	9.75	1.01	191.88	50.04	$\text{sd}(\mu)/\sigma = 0.5$
AICc	60.04	85.66	54.66	140.12		$\rho = 0.5$
AIC	880.25	869.19	884.55	509.2		$Oracle : 100$
BIC	0.12	0.09	0	0.96		
CV.1se	1.44	0.17	0.02	79.43	0.86	
CV.min	51.62	9.15	1.13	188.07	49.41	$\text{sd}(\mu)/\sigma = 0.5$
AICc	62.19	85.73	48.2	137.21		$\rho = 0.9$
AIC	878	866.48	882.09	502.58		$Oracle : 100$
BIC	0.12	0.08	0	0.91		

Table 102: **Nonzero coefficients at n=1000, binary design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	223.47	154.74	105.41	181.12	102.87	
CV.min	315.85	217.6	114.37	235.72	115.77	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	240.77	186.24	117.42	211.66		$\rho = 0$
AIC	778.83	767.52	748.55	316.97		$Oracle: 100$
BIC	151.59	123.47	98.71	142.11		
CV.1se	240.16	164.98	106.23	194.44	103.18	
CV.min	335.75	230.41	115.06	250.41	115.2	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	253.11	194.89	117.28	224.09		$\rho = 0.5$
AIC	782.5	771.91	752.25	331.54		$Oracle: 100$
BIC	158.26	128.53	99.79	149.37		
CV.1se	246.41	169.61	108.95	197.57	107.39	
CV.min	338.95	235.48	119.59	252.67	117.65	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	256.47	198	118.41	227.23		$\rho = 0.9$
AIC	779.85	768.82	749.55	334.42		$Oracle: 100$
BIC	161.59	131.61	100.9	152.24		
CV.1se	129.48	81.48	29.41	161.11	126.39	
CV.min	242.28	157.77	63.88	241.7	243.14	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	189.39	169.39	217.21	199.46		$\rho = 0$
AIC	845.87	832.2	835.41	431.73		$Oracle: 100$
BIC	0.45	3.82	0.76	16.61		
CV.1se	134.01	85.2	25.91	169.33	128.57	
CV.min	253.93	168.79	62.37	250.16	251.34	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	196.41	178.87	213.42	206.23		$\rho = 0.5$
AIC	848.39	835.64	836.52	443.43		$Oracle: 100$
BIC	0.37	1.65	0.13	10.15		
CV.1se	139.37	87.46	24.14	167.83	130.85	
CV.min	257.87	171.74	60.9	246.36	254.61	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	197.94	180.1	215.47	206.57		$\rho = 0.9$
AIC	845.72	833.26	834.34	441.87		$Oracle: 100$
BIC	0.39	1.11	0.23	8.32		
CV.1se	1.88	0.22	0.02	81.93	1.62	
CV.min	54.98	6.41	0.92	193.49	54.94	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	63.37	99.88	29.39	139.5		$\rho = 0$
AIC	881.36	869.27	889.4	509.19		$Oracle: 100$
BIC	0.11	0.03	0	0.86		
CV.1se	1.43	0.09	0.01	82.83	1.02	
CV.min	44.69	5.2	0.7	193.75	44.46	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	54.93	95.46	36.01	139.94		$\rho = 0.5$
AIC	882.37	870.91	889.49	520.33		$Oracle: 100$
BIC	0.09	0.03	0	0.76		
CV.1se	0.94	0.05	0.01	79.93	0.68	
CV.min	45.09	5.03	0.74	191.22	42.83	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	56.35	95.23	32.88	137.59		$\rho = 0.9$
AIC	879.67	867.66	886.91	511.9		$Oracle: 100$
BIC	0.09	0.04	0	0.71		

Table 103: **Nonzero coefficients at n=1000, continuous design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	40.34	30.68	20.09	29.14	18.79	
CV.min	103.9	78.64	31.79	53.91	32.54	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	98.48	71.33	25.64	50.68		$\rho = 0$
AIC	610.08	607.83	580.37	52.03		$Oracle: 100$
BIC	30.11	25.35	18.6	25.49		
CV.1se	86.05	59.04	23.03	35.08	19	
CV.min	173.55	132.87	51.75	45.39	30.05	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	146.39	111.64	45.26	45.15		$\rho = 0.5$
AIC	539.81	539.49	515.13	45.25		$Oracle: 100$
BIC	39.2	29.42	16.74	34.1		
CV.1se	150.05	120.12	60.24	11.46	32.46	
CV.min	226.55	191.32	98.49	12.56	57.98	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	190.69	161.01	82.82	12.56		$\rho = 0.9$
AIC	243.07	239.05	197.73	12.56		$Oracle: 100$
BIC	70.99	57.34	20.8	12.47		
CV.1se	23.98	18.16	12.49	38.71	11.98	
CV.min	77.49	53.9	19.15	117.83	25.81	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	78.84	49.84	13.8	97.65		$\rho = 0$
AIC	741.49	735.39	707.33	154.27		$Oracle: 100$
BIC	19.86	15.71	10.18	18.01		
CV.1se	45.77	31.55	12.77	65.81	12.38	
CV.min	125.9	93.66	27.99	125.2	23.83	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	115.2	82.06	24.12	112.61		$\rho = 0.5$
AIC	688.82	683.95	653.03	129.67		$Oracle: 100$
BIC	19.82	15.2	8.11	24.07		
CV.1se	62.14	64.79	38.31	15.38	24.64	
CV.min	158.84	137.59	66.38	26.63	50.69	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	141.65	114.91	50.47	26.13		$\rho = 0.9$
AIC	377.46	388.23	358.14	26.22		$Oracle: 100$
BIC	1.36	1.04	1.11	15.95		
CV.1se	8.78	6.97	4.92	44.77	5.07	
CV.min	48.42	28.79	9.73	141.49	21.83	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	56.7	24.13	4.05	106.25		$\rho = 0$
AIC	829.74	821.32	811.77	313.14		$Oracle: 100$
BIC	8.98	6.22	1.64	10.12		
CV.1se	4.33	5.42	3.21	52.59	5.19	
CV.min	56.94	45.93	11.07	139.54	16.12	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	67.06	38.82	2.93	114.56		$\rho = 0.5$
AIC	798.16	790.33	773.25	252.9		$Oracle: 100$
BIC	2.46	1.78	0.96	3.45		
CV.1se	1.01	1	1	12.07	1.21	
CV.min	6.85	5.05	2.4	56.99	10.11	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	12.81	1.83	1	55.68		$\rho = 0.9$
AIC	535.11	553.6	520.08	64.94		$Oracle: 100$
BIC	1.36	1.03	1	2.67		

Table 104: **Nonzero coefficients at n=1000, continuous design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	177.38	131.7	74.1	139.2	83.5	
CV.min	275.72	210.8	97.57	203.17	139.13	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	212.26	171.93	108.71	182.62		$\rho = 0$
AIC	741.02	732.57	703.83	242.07		$Oracle$: 100
BIC	95.76	78.13	54.98	87.86		
CV.1se	284.92	221.99	104.54	200.39	91.86	
CV.min	390.74	318.95	154.52	253.92	139.8	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	283.84	240.7	155.72	232.46		$\rho = 0.5$
AIC	719.34	711.54	681.23	267.94		$Oracle$: 100
BIC	62.29	84.45	62.49	91.74		
CV.1se	342.59	289.9	175.27	48.48	139.78	
CV.min	426.59	380.66	224.62	62.76	179.84	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	323.91	291.1	206.31	62.23		$\rho = 0.9$
AIC	432.07	415.11	370.19	62.42		$Oracle$: 100
BIC	1.55	1.06	4.77	34.2		
CV.1se	93.83	63.48	33.21	117.33	61.69	
CV.min	191.52	129.04	51.84	200.59	145.7	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	156.08	118.76	84.3	163.3		$\rho = 0$
AIC	822.66	811.93	802.09	348.76		$Oracle$: 100
BIC	26.51	23.2	1.76	42.37		
CV.1se	116.23	101.52	43.51	150.2	57.17	
CV.min	248.97	201.84	79.21	228.54	105.01	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	188.55	164.27	129.46	198.09		$\rho = 0.5$
AIC	811.45	802.63	786.48	377.81		$Oracle$: 100
BIC	1.34	0.96	0.16	4.54		
CV.1se	16.24	49.35	37.22	47.73	92.25	
CV.min	110.88	164.45	92.11	90.68	141.73	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	77.11	65.1	63.49	88.14		$\rho = 0.9$
AIC	564.08	550.45	509.2	94.01		$Oracle$: 100
BIC	1.46	1.06	1	3.43		
CV.1se	5.04	1.84	0.27	78.71	3.9	
CV.min	67.7	25	3.78	182.97	65.96	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	73.06	29.17	0.23	135.27		$\rho = 0$
AIC	872.57	861.49	872.49	464.17		$Oracle$: 100
BIC	0.42	0.1	0	2.77		
CV.1se	0.13	0.06	0.02	43.35	0.49	
CV.min	14.69	7.95	0.88	147.92	13.99	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	30.49	3.35	0.77	112.34		$\rho = 0.5$
AIC	864.61	855.17	859.36	476.25		$Oracle$: 100
BIC	0.17	0.07	0	0.7		
CV.1se	0.17	0.19	0.28	3.68	0.45	
CV.min	7.69	4.71	1.41	51.18	2.9	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	12.68	1.51	0.94	56.79		$\rho = 0.9$
AIC	692.69	673.84	660.71	101.17		$Oracle$: 100
BIC	1.3	1.01	0.74	1.5		

Table 105: **Nonzero coefficients at n=1000, continuous design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	216.7	158.99	101.3	173.7	101.8	
CV.min	312.77	230.16	117.75	232.7	132.73	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	238.55	186.96	107.23	207.88		$\rho = 0$
AIC	767.5	757.71	734.48	297.7		$Oracle:100$
BIC	136.65	112.43	87.7	125.42		
CV.1se	351.92	280.15	152.5	261.44	138.66	
CV.min	448.81	363.11	190.88	328	170.95	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	332.16	280.87	159.41	287.02		$\rho = 0.5$
AIC	760.54	751.67	726.14	361.97		$Oracle:100$
BIC	1.19	6.74	120.59	12.88		
CV.1se	409.63	353.68	229.43	68.54	198.23	
CV.min	490.29	435.49	269.98	105.81	229.09	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	373.98	338.52	227.04	102.44		$\rho = 0.9$
AIC	496.49	474.8	427.14	106.07		$Oracle:100$
BIC	2.07	1.34	2.69	5.12		
CV.1se	121.2	79.38	35.15	149.49	107.9	
CV.min	229.92	153.4	64.98	231.73	221.09	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	180.82	144.1	136.48	189.01		$\rho = 0$
AIC	838.97	826.44	824.64	408.23		$Oracle:100$
BIC	1.65	2.86	0.11	31.63		
CV.1se	75.16	77.87	8.87	160.02	77.52	
CV.min	252.28	210.01	41.08	248.98	158.93	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	175.12	184.13	177.3	207.76		$\rho = 0.5$
AIC	836.61	826.58	817.29	462.59		$Oracle:100$
BIC	0.38	0.2	0	1.65		
CV.1se	1.15	3.51	0.81	32.58	21.48	
CV.min	19.35	34.54	3.75	97.19	72.07	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	21.41	6.15	13.14	101.16		$\rho = 0.9$
AIC	626.79	608.57	575.17	142.13		$Oracle:100$
BIC	1.67	1.15	0.99	1.86		
CV.1se	2.53	0.45	0.06	83.46	1.85	
CV.min	58.87	10.96	1.34	192.27	60.1	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	67.63	21.93	1.15	139.02		$\rho = 0$
AIC	878.63	867.27	884.18	495.35		$Oracle:100$
BIC	0.16	0.01	16.91	1.21		
CV.1se	0.01	0	0	36.25	0.46	
CV.min	10.17	3.22	0.36	140.85	10.11	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	22.94	0.87	0.43	105.6		$\rho = 0.5$
AIC	870.74	859.63	869.23	510.63		$Oracle:100$
BIC	0.06	0.02	0	0.38		
CV.1se	0.04	0.05	0.08	1.22	0.44	
CV.min	8.2	4.73	1.42	36.78	4.99	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	14.12	1.34	0.47	40.6		$\rho = 0.9$
AIC	736.73	715.86	715.33	93.56		$Oracle:100$
BIC	0.88	0.66	0.14	1.32		

Table 106: **Nonzero coefficients at n=1000, continuous design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	224.63	155.19	105.5	181.42	102.74	$\mathrm{sd}(\mu)/\sigma = 2$ $\rho = 0$ $Oracle : 100$
CV.min	318.5	217.92	114.43	236.28	116.28	
AICc	241.9	179.16	101.41	213.12		
AIC	777.82	767.04	748.05	317.5		
BIC	150.79	120.13	98.02	141.96		
CV.1se	368.76	279.52	144.89	287.33	113.1	$\mathrm{sd}(\mu)/\sigma = 2$ $\rho = 0.5$ $Oracle : 100$
CV.min	460.6	352.01	163.65	357.34	126.15	
AICc	341.81	272.18	128.97	309.03		
AIC	776.77	767.31	744.78	401.13		
BIC	0.52	15.34	123.67	3.36		
CV.1se	434.56	363.17	226.51	86.17	186.96	$\mathrm{sd}(\mu)/\sigma = 2$ $\rho = 0.9$ $Oracle : 100$
CV.min	518.82	437.77	250.23	144.27	211.49	
AICc	391.51	338.85	201.81	138.83		
AIC	533.99	511.1	466.14	149.71		
BIC	2.86	1.9	51.45	2.99		
CV.1se	132.12	82.35	29.31	162.1	127.28	$\mathrm{sd}(\mu)/\sigma = 1$ $\rho = 0$ $Oracle : 100$
CV.min	244.8	158.63	64.23	242.68	244.45	
AICc	192.86	152.89	145.25	200.17		
AIC	845.23	831.63	834.85	433.28		
BIC	0.51	0.42	0.06	16		
CV.1se	39.08	39.47	0.84	157.52	43.03	$\mathrm{sd}(\mu)/\sigma = 1$ $\rho = 0.5$ $Oracle : 100$
CV.min	217.3	167.02	6.82	252.89	178.42	
AICc	140.57	184.71	200.87	206.66		
AIC	844.4	833.66	828.74	492.97		
BIC	0.17	0.07	0	1.01		
CV.1se	0.76	0.77	0.52	17.07	2.19	$\mathrm{sd}(\mu)/\sigma = 1$ $\rho = 0.9$ $Oracle : 100$
CV.min	15.64	13.74	2.38	88.07	15.8	
AICc	20.44	4.15	9.33	95.41		
AIC	663.89	643.78	617.88	192.64		
BIC	2.14	1.41	0.87	2.52		
CV.1se	1.82	0.18	0.03	84.71	1.36	$\mathrm{sd}(\mu)/\sigma = 0.5$ $\rho = 0$ $Oracle : 100$
CV.min	54.45	6.51	1.01	194.39	54.99	
AICc	63.21	17.4	0	139.85		
AIC	880.57	868.78	888.79	509.84		
BIC	0.1	0	171.44	0.9		
CV.1se	0.01	0.01	0	34.1	0.45	$\mathrm{sd}(\mu)/\sigma = 0.5$ $\rho = 0.5$ $Oracle : 100$
CV.min	9.14	2.15	0.33	138.25	9.14	
AICc	20.94	0.44	0	102.34		
AIC	871.94	859.89	873.45	519.26		
BIC	0.06	0.01	0	0.29		
CV.1se	0.03	0.03	0.04	1.03	0.45	$\mathrm{sd}(\mu)/\sigma = 0.5$ $\rho = 0.9$ $Oracle : 100$
CV.min	8.37	4.41	1.28	32.84	6	
AICc	14.04	1.13	0.16	35.73		
AIC	757.48	735.05	742.32	103.11		
BIC	0.55	0.36	0.03	1.11		

Table 107: **FDR | Sensitivity for n=100, binary design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.32 | 0.24	0.20 | 0.21	0.04 | 0.10	0.74 | 0.44	0.18 | 0.21	
CV.min	0.74 | 0.46	0.57 | 0.39	0.17 | 0.19	0.84 | 0.51	0.54 | 0.40	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.59 | 0.37	0.44 | 0.34	0.82 | 0.42	0.68 | 0.40		$\rho = 0$
AIC	0.89 | 0.59	0.88 | 0.55	0.88 | 0.44	0.87 | 0.54		$\bar{s}_{Oracle}$ = 21.3
BIC	0.89 | 0.58	0.88 | 0.55	0.88 | 0.44	0.84 | 0.52		
CV.1se	0.29 | 0.18	0.20 | 0.17	0.04 | 0.09	0.76 | 0.42	0.15 | 0.18	
CV.min	0.72 | 0.41	0.57 | 0.35	0.17 | 0.17	0.86 | 0.49	0.49 | 0.35	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.60 | 0.33	0.45 | 0.31	0.83 | 0.40	0.70 | 0.37		$\rho = 0.5$
AIC	0.90 | 0.57	0.89 | 0.54	0.89 | 0.43	0.88 | 0.52		$\bar{s}_{Oracle}$ = 20.9
BIC	0.90 | 0.56	0.89 | 0.54	0.89 | 0.43	0.86 | 0.50		
CV.1se	0.28 | 0.17	0.19 | 0.15	0.04 | 0.08	0.77 | 0.40	0.17 | 0.17	
CV.min	0.74 | 0.39	0.57 | 0.32	0.16 | 0.15	0.86 | 0.47	0.50 | 0.32	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.62 | 0.30	0.46 | 0.29	0.84 | 0.38	0.72 | 0.35		$\rho = 0.9$
AIC	0.90 | 0.55	0.89 | 0.52	0.89 | 0.41	0.89 | 0.49		$\bar{s}_{Oracle}$ = 20.7
BIC	0.90 | 0.55	0.89 | 0.52	0.89 | 0.40	0.86 | 0.48		
CV.1se	0.10 | 0.05	0.06 | 0.03	0.02 | 0.02	0.85 | 0.42	0.16 | 0.05	
CV.min	0.57 | 0.25	0.35 | 0.14	0.12 | 0.05	0.91 | 0.49	0.51 | 0.23	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.55 | 0.23	0.46 | 0.21	0.93 | 0.29	0.78 | 0.34		$\rho = 0$
AIC	0.94 | 0.54	0.94 | 0.46	0.94 | 0.31	0.93 | 0.51		$\bar{s}_{Oracle}$ = 14.5
BIC	0.93 | 0.54	0.94 | 0.46	0.94 | 0.30	0.92 | 0.51		
CV.1se	0.08 | 0.03	0.05 | 0.02	0.02 | 0.02	0.86 | 0.40	0.15 | 0.04	
CV.min	0.56 | 0.22	0.34 | 0.13	0.12 | 0.05	0.92 | 0.47	0.51 | 0.20	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.20	0.45 | 0.17	0.93 | 0.28	0.80 | 0.31		$\rho = 0.5$
AIC	0.94 | 0.51	0.94 | 0.44	0.95 | 0.30	0.93 | 0.48		$\bar{s}_{Oracle}$ = 14.4
BIC	0.94 | 0.51	0.94 | 0.44	0.95 | 0.30	0.93 | 0.48		
CV.1se	0.08 | 0.03	0.06 | 0.03	0.02 | 0.02	0.86 | 0.38	0.17 | 0.05	
CV.min	0.58 | 0.21	0.35 | 0.12	0.13 | 0.05	0.92 | 0.46	0.53 | 0.19	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58 | 0.19	0.42 | 0.16	0.93 | 0.27	0.81 | 0.30		$\rho = 0.9$
AIC	0.94 | 0.51	0.94 | 0.43	0.95 | 0.29	0.93 | 0.47		$\bar{s}_{Oracle}$ = 14.1
BIC	0.94 | 0.51	0.94 | 0.43	0.95 | 0.29	0.93 | 0.47		
CV.1se	0.03 | 0.01	0.01 | 0.00	0.01 | 0.00	0.94 | 0.34	0.30 | 0.02	
CV.min	0.43 | 0.10	0.22 | 0.03	0.10 | 0.01	0.96 | 0.42	0.55 | 0.10	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.55 | 0.11	0.79 | 0.19	0.98 | 0.20	0.91 | 0.23		$\rho = 0$
AIC	0.97 | 0.46	0.98 | 0.34	0.98 | 0.22	0.97 | 0.44		$\bar{s}_{Oracle}$ = 7.8
BIC	0.97 | 0.46	0.97 | 0.34	0.98 | 0.22	0.97 | 0.44		
CV.1se	0.03 | 0.01	0.02 | 0.01	0.02 | 0.00	0.94 | 0.32	0.30 | 0.01	
CV.min	0.43 | 0.09	0.23 | 0.03	0.12 | 0.01	0.96 | 0.40	0.58 | 0.09	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.09	0.75 | 0.16	0.98 | 0.18	0.90 | 0.23		$\rho = 0.5$
AIC	0.97 | 0.43	0.98 | 0.32	0.98 | 0.20	0.97 | 0.42		$\bar{s}_{Oracle}$ = 8.0
BIC	0.97 | 0.43	0.98 | 0.31	0.98 | 0.20	0.97 | 0.42		
CV.1se	0.03 | 0.01	0.03 | 0.00	0.02 | 0.00	0.94 | 0.32	0.31 | 0.02	
CV.min	0.45 | 0.10	0.21 | 0.03	0.10 | 0.02	0.97 | 0.39	0.61 | 0.10	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.10	0.71 | 0.17	0.98 | 0.19	0.92 | 0.23		$\rho = 0.9$
AIC	0.97 | 0.45	0.98 | 0.33	0.98 | 0.21	0.97 | 0.41		$\bar{s}_{Oracle}$ = 7.6
BIC	0.97 | 0.44	0.98 | 0.33	0.98 | 0.20	0.97 | 0.41		

Table 108: **FDR | Sensitivity for n=100, binary design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.07 | 0.01	0.02 | 0.00	0.02 | 0.00	0.79 | 0.19	0.21 | 0.01	
CV.min	0.46 | 0.07	0.18 | 0.01	0.08 | 0.01	0.84 | 0.25	0.53 | 0.08	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.47 | 0.05	0.77 | 0.12	0.89 | 0.11	0.72 | 0.11		$\rho = 0$
AIC	0.86 | 0.29	0.88 | 0.21	0.90 | 0.13	0.85 | 0.26		$\bar{s}_{Oracle}$ = 56.8
BIC	0.86 | 0.29	0.88 | 0.20	0.90 | 0.13	0.85 | 0.26		
CV.1se	0.05 | 0.00	0.02 | 0.00	0.01 | 0.00	0.80 | 0.17	0.20 | 0.01	
CV.min	0.45 | 0.06	0.20 | 0.01	0.08 | 0.00	0.84 | 0.23	0.50 | 0.06	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.48 | 0.04	0.76 | 0.11	0.89 | 0.11	0.74 | 0.11		$\rho = 0.5$
AIC	0.87 | 0.28	0.88 | 0.20	0.91 | 0.12	0.86 | 0.25		$\bar{s}_{Oracle}$ = 56.2
BIC	0.87 | 0.28	0.88 | 0.20	0.91 | 0.12	0.86 | 0.25		
CV.1se	0.05 | 0.01	0.03 | 0.00	0.01 | 0.00	0.80 | 0.16	0.22 | 0.01	
CV.min	0.44 | 0.06	0.21 | 0.01	0.10 | 0.00	0.85 | 0.22	0.51 | 0.06	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.48 | 0.04	0.73 | 0.10	0.90 | 0.10	0.76 | 0.10		$\rho = 0.9$
AIC	0.87 | 0.27	0.89 | 0.20	0.91 | 0.12	0.86 | 0.24		$\bar{s}_{Oracle}$ = 56.5
BIC	0.87 | 0.27	0.89 | 0.19	0.91 | 0.12	0.86 | 0.24		
CV.1se	0.04 | 0.00	0.01 | 0.00	0.01 | 0.00	0.88 | 0.19	0.28 | 0.01	
CV.min	0.43 | 0.05	0.18 | 0.01	0.09 | 0.00	0.91 | 0.25	0.55 | 0.05	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.52 | 0.04	0.90 | 0.13	0.94 | 0.11	0.84 | 0.11		$\rho = 0$
AIC	0.92 | 0.30	0.94 | 0.20	0.95 | 0.12	0.92 | 0.27		$\bar{s}_{Oracle}$ = 31.7
BIC	0.92 | 0.29	0.94 | 0.20	0.95 | 0.12	0.92 | 0.27		
CV.1se	0.03 | 0.00	0.03 | 0.00	0.01 | 0.00	0.89 | 0.17	0.27 | 0.01	
CV.min	0.43 | 0.04	0.21 | 0.01	0.08 | 0.00	0.92 | 0.23	0.54 | 0.04	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.52 | 0.04	0.90 | 0.12	0.94 | 0.11	0.85 | 0.11		$\rho = 0.5$
AIC	0.93 | 0.28	0.94 | 0.19	0.95 | 0.12	0.92 | 0.25		$\bar{s}_{Oracle}$ = 31.4
BIC	0.93 | 0.28	0.94 | 0.19	0.95 | 0.12	0.92 | 0.25		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.01 | 0.00	0.89 | 0.17	0.26 | 0.01	
CV.min	0.42 | 0.04	0.20 | 0.01	0.10 | 0.00	0.92 | 0.23	0.55 | 0.04	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.52 | 0.04	0.89 | 0.12	0.95 | 0.10	0.86 | 0.10		$\rho = 0.9$
AIC	0.93 | 0.27	0.94 | 0.19	0.95 | 0.12	0.93 | 0.25		$\bar{s}_{Oracle}$ = 31.0
BIC	0.93 | 0.27	0.94 | 0.18	0.95 | 0.12	0.93 | 0.24		
CV.1se	0.03 | 0.00	0.01 | 0.00	0.02 | 0.00	0.96 | 0.19	0.31 | 0.01	
CV.min	0.40 | 0.04	0.16 | 0.01	0.10 | 0.00	0.98 | 0.25	0.61 | 0.04	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.04	0.98 | 0.13	0.98 | 0.11	0.94 | 0.11		$\rho = 0$
AIC	0.98 | 0.29	0.98 | 0.18	0.99 | 0.12	0.98 | 0.27		$\bar{s}_{Oracle}$ = 8.5
BIC	0.98 | 0.29	0.98 | 0.17	0.99 | 0.12	0.98 | 0.27		
CV.1se	0.01 | 0.00	0.02 | 0.00	0.01 | 0.00	0.97 | 0.18	0.34 | 0.01	
CV.min	0.42 | 0.03	0.16 | 0.01	0.10 | 0.00	0.98 | 0.24	0.59 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.53 | 0.03	0.98 | 0.13	0.98 | 0.12	0.94 | 0.11		$\rho = 0.5$
AIC	0.98 | 0.28	0.98 | 0.18	0.99 | 0.13	0.98 | 0.26		$\bar{s}_{Oracle}$ = 8.9
BIC	0.98 | 0.28	0.98 | 0.18	0.98 | 0.13	0.98 | 0.26		
CV.1se	0.02 | 0.00	0.01 | 0.00	0.01 | 0.00	0.96 | 0.18	0.33 | 0.01	
CV.min	0.41 | 0.04	0.18 | 0.01	0.10 | 0.01	0.98 | 0.25	0.62 | 0.04	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.59 | 0.04	0.98 | 0.13	0.99 | 0.12	0.95 | 0.12		$\rho = 0.9$
AIC	0.98 | 0.29	0.98 | 0.19	0.99 | 0.12	0.98 | 0.27		$\bar{s}_{Oracle}$ = 8.1
BIC	0.98 | 0.29	0.98 | 0.18	0.99 | 0.12	0.98 | 0.27		

Table 109: **FDR | Sensitivity for n=100, binary design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.05 | 0.00	0.02 | 0.00	0.01 | 0.00	0.80 | 0.13	0.24 | 0.00	
CV.min	0.42 | 0.04	0.16 | 0.01	0.09 | 0.00	0.83 | 0.18	0.53 | 0.04	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.45 | 0.03	0.83 | 0.10	0.88 | 0.09	0.75 | 0.07		$\rho = 0$
AIC	0.85 | 0.23	0.87 | 0.15	0.89 | 0.10	0.84 | 0.20		$\bar{s}_{Oracle}$ = 78.1
BIC	0.85 | 0.23	0.87 | 0.15	0.89 | 0.10	0.84 | 0.20		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.01 | 0.00	0.81 | 0.12	0.22 | 0.00	
CV.min	0.43 | 0.03	0.18 | 0.00	0.09 | 0.00	0.84 | 0.17	0.51 | 0.03	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.47 | 0.02	0.84 | 0.09	0.89 | 0.08	0.76 | 0.07		$\rho = 0.5$
AIC	0.86 | 0.21	0.88 | 0.15	0.89 | 0.10	0.85 | 0.19		$\bar{s}_{Oracle}$ = 77.8
BIC	0.86 | 0.21	0.88 | 0.14	0.89 | 0.10	0.85 | 0.19		
CV.1se	0.04 | 0.00	0.03 | 0.00	0.01 | 0.00	0.81 | 0.12	0.26 | 0.00	
CV.min	0.44 | 0.03	0.20 | 0.00	0.09 | 0.00	0.84 | 0.17	0.55 | 0.03	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.51 | 0.02	0.84 | 0.09	0.89 | 0.08	0.77 | 0.06		$\rho = 0.9$
AIC	0.86 | 0.21	0.88 | 0.14	0.89 | 0.10	0.85 | 0.19		$\bar{s}_{Oracle}$ = 77.2
BIC	0.86 | 0.21	0.88 | 0.14	0.89 | 0.09	0.85 | 0.18		
CV.1se	0.04 | 0.00	0.01 | 0.00	0.01 | 0.00	0.90 | 0.14	0.32 | 0.00	
CV.min	0.45 | 0.04	0.16 | 0.00	0.10 | 0.00	0.92 | 0.19	0.60 | 0.03	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.55 | 0.03	0.93 | 0.10	0.94 | 0.09	0.86 | 0.07		$\rho = 0$
AIC	0.93 | 0.23	0.94 | 0.15	0.95 | 0.10	0.92 | 0.21		$\bar{s}_{Oracle}$ = 38.0
BIC	0.93 | 0.23	0.94 | 0.14	0.95 | 0.10	0.92 | 0.21		
CV.1se	0.04 | 0.00	0.02 | 0.00	0.02 | 0.00	0.90 | 0.13	0.33 | 0.00	
CV.min	0.42 | 0.03	0.18 | 0.00	0.08 | 0.00	0.92 | 0.19	0.59 | 0.03	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.52 | 0.02	0.93 | 0.10	0.95 | 0.09	0.88 | 0.07		$\rho = 0.5$
AIC	0.93 | 0.23	0.94 | 0.15	0.95 | 0.10	0.93 | 0.20		$\bar{s}_{Oracle}$ = 36.9
BIC	0.93 | 0.23	0.94 | 0.15	0.95 | 0.10	0.93 | 0.20		
CV.1se	0.03 | 0.00	0.01 | 0.00	0.02 | 0.00	0.90 | 0.13	0.29 | 0.01	
CV.min	0.45 | 0.03	0.19 | 0.00	0.10 | 0.00	0.92 | 0.18	0.58 | 0.03	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.02	0.93 | 0.10	0.95 | 0.09	0.87 | 0.07		$\rho = 0.9$
AIC	0.93 | 0.23	0.94 | 0.15	0.95 | 0.10	0.93 | 0.20		$\bar{s}_{Oracle}$ = 37.1
BIC	0.93 | 0.23	0.94 | 0.15	0.95 | 0.10	0.93 | 0.20		
CV.1se	0.02 | 0.00	0.01 | 0.00	0.02 | 0.00	0.97 | 0.15	0.34 | 0.00	
CV.min	0.41 | 0.03	0.15 | 0.00	0.09 | 0.00	0.98 | 0.21	0.62 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.02	0.99 | 0.10	0.99 | 0.09	0.96 | 0.07		$\rho = 0$
AIC	0.99 | 0.26	0.99 | 0.14	0.99 | 0.10	0.98 | 0.23		$\bar{s}_{Oracle}$ = 6.6
BIC	0.99 | 0.26	0.99 | 0.14	0.99 | 0.10	0.98 | 0.23		
CV.1se	0.02 | 0.00	0.01 | 0.00	0.01 | 0.00	0.97 | 0.15	0.35 | 0.01	
CV.min	0.43 | 0.02	0.15 | 0.00	0.09 | 0.00	0.98 | 0.20	0.61 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.58 | 0.03	0.99 | 0.10	0.99 | 0.09	0.95 | 0.09		$\rho = 0.5$
AIC	0.99 | 0.24	0.99 | 0.14	0.99 | 0.10	0.98 | 0.22		$\bar{s}_{Oracle}$ = 6.9
BIC	0.99 | 0.24	0.99 | 0.14	0.99 | 0.10	0.98 | 0.22		
CV.1se	0.03 | 0.00	0.01 | 0.00	0.02 | 0.00	0.97 | 0.14	0.34 | 0.00	
CV.min	0.43 | 0.03	0.16 | 0.00	0.09 | 0.00	0.98 | 0.20	0.63 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.60 | 0.03	0.99 | 0.11	0.99 | 0.10	0.96 | 0.08		$\rho = 0.9$
AIC	0.99 | 0.25	0.99 | 0.15	0.99 | 0.11	0.98 | 0.23		$\bar{s}_{Oracle}$ = 6.4
BIC	0.99 | 0.25	0.99 | 0.15	0.99 | 0.11	0.98 | 0.23		

Table 110: **FDR | Sensitivity for n=100, binary design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.05 | 0.00	0.01 | 0.00	0.02 | 0.00	0.83 | 0.10	0.27 | 0.00	
CV.min	0.43 | 0.03	0.16 | 0.00	0.09 | 0.00	0.85 | 0.14	0.57 | 0.03	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.50 | 0.02	0.86 | 0.07	0.88 | 0.07	0.79 | 0.05		$\rho = 0$
AIC	0.86 | 0.18	0.88 | 0.12	0.89 | 0.08	0.85 | 0.16		$\bar{s}_{Oracle}$ = 91.2
BIC	0.86 | 0.18	0.88 | 0.12	0.89 | 0.08	0.85 | 0.15		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.02 | 0.00	0.83 | 0.09	0.26 | 0.00	
CV.min	0.42 | 0.02	0.16 | 0.00	0.10 | 0.00	0.85 | 0.14	0.55 | 0.02	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.50 | 0.01	0.87 | 0.07	0.89 | 0.07	0.79 | 0.05		$\rho = 0.5$
AIC	0.86 | 0.18	0.88 | 0.12	0.89 | 0.08	0.86 | 0.15		$\bar{s}_{Oracle}$ = 90.8
BIC	0.86 | 0.18	0.88 | 0.12	0.89 | 0.08	0.86 | 0.15		
CV.1se	0.04 | 0.00	0.02 | 0.00	0.02 | 0.00	0.83 | 0.09	0.29 | 0.00	
CV.min	0.44 | 0.02	0.18 | 0.00	0.11 | 0.00	0.85 | 0.13	0.58 | 0.02	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.53 | 0.01	0.87 | 0.07	0.89 | 0.07	0.81 | 0.04		$\rho = 0.9$
AIC	0.86 | 0.17	0.88 | 0.12	0.89 | 0.08	0.86 | 0.15		$\bar{s}_{Oracle}$ = 90.3
BIC	0.86 | 0.17	0.88 | 0.11	0.89 | 0.08	0.86 | 0.15		
CV.1se	0.03 | 0.00	0.01 | 0.00	0.01 | 0.00	0.91 | 0.11	0.34 | 0.00	
CV.min	0.44 | 0.03	0.15 | 0.00	0.10 | 0.00	0.93 | 0.16	0.64 | 0.03	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.55 | 0.02	0.94 | 0.08	0.95 | 0.08	0.90 | 0.06		$\rho = 0$
AIC	0.94 | 0.20	0.94 | 0.12	0.95 | 0.08	0.93 | 0.17		$\bar{s}_{Oracle}$ = 41.6
BIC	0.94 | 0.20	0.95 | 0.12	0.95 | 0.08	0.93 | 0.17		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.02 | 0.00	0.92 | 0.11	0.32 | 0.00	
CV.min	0.45 | 0.02	0.17 | 0.00	0.09 | 0.00	0.93 | 0.16	0.62 | 0.02	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.02	0.94 | 0.08	0.95 | 0.08	0.90 | 0.05		$\rho = 0.5$
AIC	0.94 | 0.20	0.94 | 0.12	0.95 | 0.09	0.94 | 0.17		$\bar{s}_{Oracle}$ = 41.3
BIC	0.94 | 0.19	0.94 | 0.12	0.95 | 0.09	0.94 | 0.17		
CV.1se	0.04 | 0.00	0.01 | 0.00	0.01 | 0.00	0.92 | 0.11	0.33 | 0.00	
CV.min	0.46 | 0.02	0.19 | 0.00	0.11 | 0.00	0.93 | 0.15	0.62 | 0.02	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.02	0.94 | 0.08	0.95 | 0.08	0.90 | 0.06		$\rho = 0.9$
AIC	0.94 | 0.20	0.95 | 0.13	0.95 | 0.09	0.94 | 0.17		$\bar{s}_{Oracle}$ = 40.7
BIC	0.94 | 0.20	0.95 | 0.12	0.95 | 0.09	0.94 | 0.17		
CV.1se	0.03 | 0.00	0.01 | 0.00	0.01 | 0.00	0.98 | 0.11	0.35 | 0.00	
CV.min	0.42 | 0.02	0.14 | 0.00	0.09 | 0.00	0.99 | 0.18	0.62 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.02	0.99 | 0.08	0.99 | 0.08	0.97 | 0.06		$\rho = 0$
AIC	0.99 | 0.24	0.99 | 0.11	0.99 | 0.08	0.99 | 0.20		$\bar{s}_{Oracle}$ = 5.1
BIC	0.99 | 0.24	0.99 | 0.10	0.99 | 0.08	0.99 | 0.20		
CV.1se	0.03 | 0.00	0.01 | 0.00	0.01 | 0.00	0.98 | 0.13	0.36 | 0.00	
CV.min	0.44 | 0.02	0.14 | 0.00	0.08 | 0.00	0.99 | 0.18	0.64 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.03	0.99 | 0.09	0.99 | 0.09	0.97 | 0.07		$\rho = 0.5$
AIC	0.99 | 0.21	0.99 | 0.12	0.99 | 0.09	0.99 | 0.20		$\bar{s}_{Oracle}$ = 5.6
BIC	0.99 | 0.21	0.99 | 0.12	0.99 | 0.09	0.99 | 0.20		
CV.1se	0.02 | 0.00	0.01 | 0.00	0.01 | 0.00	0.97 | 0.13	0.35 | 0.01	
CV.min	0.44 | 0.02	0.17 | 0.01	0.09 | 0.00	0.99 | 0.19	0.65 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.58 | 0.03	0.99 | 0.10	0.99 | 0.09	0.97 | 0.07		$\rho = 0.9$
AIC	0.99 | 0.23	0.99 | 0.13	0.99 | 0.10	0.99 | 0.21		$\bar{s}_{Oracle}$ = 5.2
BIC	0.99 | 0.23	0.99 | 0.12	0.99 | 0.10	0.99 | 0.21		

Table 111: **FDR | Sensitivity for n=100, continuous design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.29 | 0.23	0.17 | 0.19	0.03 | 0.10	0.73 | 0.45	0.17 | 0.20	
CV.min	0.72 | 0.46	0.54 | 0.38	0.15 | 0.19	0.84 | 0.52	0.52 | 0.39	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.58 | 0.37	0.24 | 0.25	0.80 | 0.41	0.67 | 0.40		$\rho = 0$
AIC	0.89 | 0.59	0.88 | 0.56	0.88 | 0.44	0.87 | 0.54		$\bar{s}_{Oracle}$ = 20.7
BIC	0.89 | 0.59	0.88 | 0.56	0.88 | 0.44	0.84 | 0.53		
CV.1se	0.08 | 0.03	0.07 | 0.03	0.02 | 0.03	0.85 | 0.19	0.10 | 0.06	
CV.min	0.62 | 0.12	0.51 | 0.10	0.14 | 0.06	0.92 | 0.25	0.39 | 0.12	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.11	0.17 | 0.06	0.70 | 0.18	0.84 | 0.15		$\rho = 0.5$
AIC	0.94 | 0.34	0.94 | 0.32	0.94 | 0.25	0.94 | 0.28		$\bar{s}_{Oracle}$ = 20.4
BIC	0.94 | 0.33	0.94 | 0.32	0.94 | 0.25	0.86 | 0.26		
CV.1se	0.06 | 0.06	0.04 | 0.06	0.01 | 0.06	0.54 | 0.16	0.01 | 0.06	
CV.min	0.63 | 0.08	0.51 | 0.07	0.14 | 0.06	0.81 | 0.32	0.23 | 0.06	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.65 | 0.08	0.14 | 0.06	0.00 | 0.06	0.76 | 0.22		$\rho = 0.9$
AIC	0.97 | 0.19	0.97 | 0.17	0.97 | 0.14	0.86 | 0.44		$\bar{s}_{Oracle}$ = 18.3
BIC	0.84 | 0.16	0.87 | 0.16	0.97 | 0.14	0.26 | 0.09		
CV.1se	0.09 | 0.05	0.05 | 0.04	0.02 | 0.02	0.84 | 0.42	0.12 | 0.05	
CV.min	0.54 | 0.24	0.33 | 0.14	0.10 | 0.06	0.91 | 0.50	0.50 | 0.23	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.57 | 0.23	0.11 | 0.07	0.93 | 0.28	0.78 | 0.34		$\rho = 0$
AIC	0.93 | 0.55	0.94 | 0.46	0.94 | 0.31	0.93 | 0.51		$\bar{s}_{Oracle}$ = 14.4
BIC	0.93 | 0.54	0.94 | 0.46	0.94 | 0.30	0.92 | 0.51		
CV.1se	0.04 | 0.01	0.03 | 0.01	0.02 | 0.01	0.89 | 0.19	0.15 | 0.03	
CV.min	0.50 | 0.09	0.37 | 0.06	0.13 | 0.03	0.95 | 0.26	0.47 | 0.08	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.59 | 0.09	0.10 | 0.03	0.94 | 0.17	0.87 | 0.14		$\rho = 0.5$
AIC	0.96 | 0.32	0.96 | 0.28	0.97 | 0.20	0.96 | 0.28		$\bar{s}_{Oracle}$ = 14.2
BIC	0.96 | 0.32	0.96 | 0.28	0.97 | 0.20	0.95 | 0.28		
CV.1se	0.06 | 0.08	0.04 | 0.08	0.01 | 0.09	0.44 | 0.14	0.01 | 0.09	
CV.min	0.64 | 0.14	0.51 | 0.11	0.14 | 0.10	0.86 | 0.24	0.22 | 0.11	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.65 | 0.13	0.13 | 0.10	0.02 | 0.10	0.80 | 0.17		$\rho = 0.9$
AIC	0.98 | 0.23	0.98 | 0.20	0.98 | 0.17	0.93 | 0.49		$\bar{s}_{Oracle}$ = 11.6
BIC	0.97 | 0.22	0.98 | 0.20	0.98 | 0.16	0.31 | 0.13		
CV.1se	0.03 | 0.01	0.02 | 0.01	0.01 | 0.00	0.93 | 0.35	0.27 | 0.02	
CV.min	0.41 | 0.10	0.20 | 0.04	0.10 | 0.02	0.96 | 0.43	0.55 | 0.10	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.53 | 0.11	0.24 | 0.06	0.98 | 0.20	0.90 | 0.25		$\rho = 0$
AIC	0.97 | 0.47	0.98 | 0.34	0.98 | 0.22	0.97 | 0.45		$\bar{s}_{Oracle}$ = 7.9
BIC	0.97 | 0.46	0.98 | 0.34	0.98 | 0.21	0.97 | 0.45		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.94 | 0.20	0.31 | 0.01	
CV.min	0.42 | 0.06	0.26 | 0.03	0.13 | 0.01	0.98 | 0.27	0.60 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.07	0.07 | 0.01	0.98 | 0.15	0.93 | 0.15		$\rho = 0.5$
AIC	0.98 | 0.32	0.98 | 0.26	0.99 | 0.17	0.98 | 0.30		$\bar{s}_{Oracle}$ = 7.6
BIC	0.98 | 0.31	0.98 | 0.25	0.99 | 0.17	0.98 | 0.30		
CV.1se	0.03 | 0.04	0.03 | 0.04	0.01 | 0.05	0.57 | 0.27	0.15 | 0.11	
CV.min	0.51 | 0.25	0.40 | 0.21	0.15 | 0.14	0.92 | 0.37	0.48 | 0.24	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.63 | 0.28	0.10 | 0.13	0.66 | 0.24	0.88 | 0.34		$\rho = 0.9$
AIC	0.99 | 0.38	0.99 | 0.35	0.99 | 0.31	0.98 | 0.49		$\bar{s}_{Oracle}$ = 5.5
BIC	0.99 | 0.38	0.99 | 0.35	0.99 | 0.31	0.62 | 0.33		

Table 112: **FDR | Sensitivity for n=100, continuous design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.06 | 0.01	0.03 | 0.00	0.01 | 0.00	0.78 | 0.19	0.18 | 0.01	
CV.min	0.47 | 0.08	0.20 | 0.01	0.09 | 0.00	0.83 | 0.25	0.51 | 0.07	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.47 | 0.05	0.36 | 0.05	0.89 | 0.11	0.72 | 0.12		$\rho = 0$
AIC	0.86 | 0.29	0.88 | 0.21	0.90 | 0.13	0.84 | 0.26		$\bar{s}_{Oracle}$ = 57.2
BIC	0.86 | 0.29	0.88 | 0.20	0.90 | 0.12	0.84 | 0.26		
CV.1se	0.03 | 0.00	0.03 | 0.00	0.01 | 0.00	0.86 | 0.09	0.25 | 0.00	
CV.min	0.40 | 0.02	0.24 | 0.01	0.09 | 0.00	0.90 | 0.13	0.52 | 0.02	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.52 | 0.02	0.08 | 0.00	0.92 | 0.08	0.85 | 0.05		$\rho = 0.5$
AIC	0.91 | 0.18	0.92 | 0.15	0.93 | 0.10	0.91 | 0.16		$\bar{s}_{Oracle}$ = 57.0
BIC	0.91 | 0.18	0.92 | 0.15	0.93 | 0.10	0.91 | 0.16		
CV.1se	0.04 | 0.00	0.04 | 0.01	0.02 | 0.01	0.51 | 0.03	0.08 | 0.01	
CV.min	0.54 | 0.03	0.44 | 0.02	0.18 | 0.01	0.85 | 0.06	0.41 | 0.02	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.62 | 0.03	0.10 | 0.01	0.43 | 0.04	0.81 | 0.04		$\rho = 0.9$
AIC	0.93 | 0.14	0.93 | 0.12	0.93 | 0.10	0.91 | 0.15		$\bar{s}_{Oracle}$ = 55.0
BIC	0.93 | 0.14	0.93 | 0.12	0.93 | 0.09	0.50 | 0.05		
CV.1se	0.04 | 0.00	0.02 | 0.00	0.01 | 0.00	0.88 | 0.19	0.25 | 0.01	
CV.min	0.44 | 0.05	0.18 | 0.01	0.10 | 0.00	0.91 | 0.25	0.55 | 0.05	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.54 | 0.05	0.60 | 0.08	0.94 | 0.12	0.84 | 0.12		$\rho = 0$
AIC	0.93 | 0.30	0.94 | 0.20	0.95 | 0.13	0.92 | 0.27		$\bar{s}_{Oracle}$ = 30.6
BIC	0.93 | 0.30	0.94 | 0.20	0.95 | 0.13	0.92 | 0.27		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.01 | 0.00	0.91 | 0.09	0.30 | 0.00	
CV.min	0.36 | 0.02	0.23 | 0.01	0.11 | 0.00	0.94 | 0.15	0.56 | 0.02	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.52 | 0.02	0.14 | 0.01	0.96 | 0.08	0.91 | 0.06		$\rho = 0.5$
AIC	0.95 | 0.20	0.95 | 0.15	0.96 | 0.10	0.95 | 0.17		$\bar{s}_{Oracle}$ = 30.4
BIC	0.95 | 0.19	0.95 | 0.15	0.96 | 0.10	0.95 | 0.17		
CV.1se	0.03 | 0.01	0.03 | 0.01	0.02 | 0.00	0.54 | 0.04	0.17 | 0.01	
CV.min	0.46 | 0.04	0.35 | 0.03	0.15 | 0.01	0.89 | 0.09	0.50 | 0.03	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.57 | 0.04	0.09 | 0.01	0.83 | 0.08	0.85 | 0.07		$\rho = 0.9$
AIC	0.96 | 0.16	0.96 | 0.14	0.96 | 0.11	0.95 | 0.20		$\bar{s}_{Oracle}$ = 27.7
BIC	0.96 | 0.16	0.96 | 0.14	0.96 | 0.11	0.66 | 0.10		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.02 | 0.00	0.96 | 0.19	0.30 | 0.00	
CV.min	0.43 | 0.04	0.17 | 0.00	0.10 | 0.00	0.98 | 0.24	0.60 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.59 | 0.03	0.93 | 0.12	0.98 | 0.11	0.95 | 0.11		$\rho = 0$
AIC	0.98 | 0.29	0.98 | 0.18	0.99 | 0.11	0.98 | 0.26		$\bar{s}_{Oracle}$ = 8.7
BIC	0.98 | 0.29	0.98 | 0.18	0.99 | 0.11	0.98 | 0.26		
CV.1se	0.02 | 0.00	0.01 | 0.00	0.01 | 0.00	0.95 | 0.12	0.32 | 0.00	
CV.min	0.40 | 0.02	0.19 | 0.00	0.11 | 0.00	0.98 | 0.17	0.59 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.59 | 0.03	0.50 | 0.05	0.99 | 0.10	0.96 | 0.08		$\rho = 0.5$
AIC	0.98 | 0.23	0.99 | 0.16	0.99 | 0.11	0.98 | 0.20		$\bar{s}_{Oracle}$ = 8.5
BIC	0.98 | 0.23	0.99 | 0.16	0.99 | 0.11	0.98 | 0.20		
CV.1se	0.01 | 0.00	0.02 | 0.00	0.01 | 0.00	0.58 | 0.10	0.31 | 0.01	
CV.min	0.42 | 0.07	0.27 | 0.04	0.12 | 0.01	0.94 | 0.20	0.60 | 0.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.08	0.07 | 0.01	0.98 | 0.18	0.92 | 0.16		$\rho = 0.9$
AIC	0.99 | 0.28	0.99 | 0.23	0.99 | 0.20	0.98 | 0.30		$\bar{s}_{Oracle}$ = 7.3
BIC	0.99 | 0.28	0.99 | 0.23	0.99 | 0.20	0.84 | 0.21		

Table 113: **FDR | Sensitivity for n=100, continuous design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.04 | 0.00	0.01 | 0.00	0.01 | 0.00	0.80 | 0.13	0.22 | 0.00	
CV.min	0.43 | 0.04	0.15 | 0.00	0.08 | 0.00	0.83 | 0.18	0.51 | 0.04	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.48 | 0.03	0.67 | 0.07	0.88 | 0.09	0.74 | 0.07		$\rho = 0$
AIC	0.85 | 0.23	0.87 | 0.15	0.89 | 0.10	0.84 | 0.20		$\bar{s}_{Oracle}$ = 77.5
BIC	0.85 | 0.22	0.87 | 0.15	0.89 | 0.10	0.84 | 0.20		
CV.1se	0.02 | 0.00	0.01 | 0.00	0.01 | 0.00	0.86 | 0.07	0.26 | 0.00	
CV.min	0.39 | 0.01	0.20 | 0.00	0.09 | 0.00	0.89 | 0.11	0.54 | 0.01	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.51 | 0.01	0.17 | 0.01	0.91 | 0.07	0.85 | 0.04		$\rho = 0.5$
AIC	0.90 | 0.16	0.90 | 0.12	0.91 | 0.09	0.90 | 0.13		$\bar{s}_{Oracle}$ = 77.5
BIC	0.90 | 0.15	0.90 | 0.12	0.91 | 0.09	0.89 | 0.13		
CV.1se	0.03 | 0.00	0.03 | 0.00	0.02 | 0.00	0.55 | 0.02	0.18 | 0.00	
CV.min	0.45 | 0.01	0.32 | 0.01	0.15 | 0.00	0.85 | 0.04	0.47 | 0.01	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.56 | 0.01	0.09 | 0.00	0.84 | 0.06	0.82 | 0.03		$\rho = 0.9$
AIC	0.91 | 0.13	0.92 | 0.11	0.92 | 0.09	0.90 | 0.12		$\bar{s}_{Oracle}$ = 76.0
BIC	0.91 | 0.13	0.92 | 0.11	0.92 | 0.09	0.67 | 0.06		
CV.1se	0.04 | 0.00	0.02 | 0.00	0.01 | 0.00	0.90 | 0.14	0.26 | 0.00	
CV.min	0.43 | 0.03	0.17 | 0.00	0.09 | 0.00	0.92 | 0.19	0.57 | 0.03	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.54 | 0.03	0.86 | 0.09	0.95 | 0.09	0.87 | 0.07		$\rho = 0$
AIC	0.93 | 0.24	0.94 | 0.15	0.95 | 0.10	0.93 | 0.21		$\bar{s}_{Oracle}$ = 37.7
BIC	0.93 | 0.23	0.94 | 0.15	0.95 | 0.10	0.92 | 0.21		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.01 | 0.00	0.92 | 0.08	0.32 | 0.00	
CV.min	0.39 | 0.01	0.21 | 0.00	0.10 | 0.00	0.94 | 0.12	0.57 | 0.01	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.53 | 0.01	0.38 | 0.03	0.96 | 0.07	0.92 | 0.04		$\rho = 0.5$
AIC	0.95 | 0.17	0.95 | 0.13	0.96 | 0.09	0.95 | 0.15		$\bar{s}_{Oracle}$ = 37.2
BIC	0.95 | 0.17	0.95 | 0.12	0.96 | 0.08	0.95 | 0.15		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.55 | 0.03	0.26 | 0.00	
CV.min	0.40 | 0.02	0.28 | 0.01	0.13 | 0.00	0.92 | 0.07	0.54 | 0.02	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.53 | 0.02	0.07 | 0.00	0.95 | 0.08	0.88 | 0.04		$\rho = 0.9$
AIC	0.96 | 0.15	0.96 | 0.12	0.96 | 0.10	0.95 | 0.16		$\bar{s}_{Oracle}$ = 34.6
BIC	0.96 | 0.15	0.96 | 0.12	0.96 | 0.10	0.74 | 0.09		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.02 | 0.00	0.97 | 0.15	0.34 | 0.00	
CV.min	0.45 | 0.03	0.16 | 0.00	0.10 | 0.00	0.98 | 0.20	0.63 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.59 | 0.03	0.98 | 0.10	0.99 | 0.10	0.96 | 0.08		$\rho = 0$
AIC	0.99 | 0.25	0.99 | 0.14	0.99 | 0.10	0.98 | 0.22		$\bar{s}_{Oracle}$ = 6.8
BIC	0.98 | 0.25	0.99 | 0.14	0.99 | 0.10	0.98 | 0.22		
CV.1se	0.03 | 0.00	0.01 | 0.00	0.01 | 0.00	0.95 | 0.10	0.34 | 0.00	
CV.min	0.39 | 0.02	0.18 | 0.00	0.10 | 0.00	0.99 | 0.17	0.63 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.55 | 0.02	0.82 | 0.07	0.99 | 0.09	0.96 | 0.06		$\rho = 0.5$
AIC	0.99 | 0.22	0.99 | 0.15	0.99 | 0.10	0.99 | 0.20		$\bar{s}_{Oracle}$ = 6.7
BIC	0.99 | 0.22	0.99 | 0.14	0.99 | 0.10	0.99 | 0.20		
CV.1se	0.01 | 0.00	0.01 | 0.00	0.01 | 0.00	0.57 | 0.07	0.31 | 0.00	
CV.min	0.41 | 0.04	0.23 | 0.01	0.11 | 0.00	0.95 | 0.16	0.60 | 0.04	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.04	0.06 | 0.00	0.99 | 0.15	0.94 | 0.11		$\rho = 0.9$
AIC	0.99 | 0.24	0.99 | 0.20	0.99 | 0.16	0.99 | 0.26		$\bar{s}_{Oracle}$ = 6.4
BIC	0.99 | 0.24	0.99 | 0.20	0.99 | 0.16	0.86 | 0.17		

Table 114: **FDR | Sensitivity for n=100, continuous design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.03 | 0.00	0.02 | 0.00	0.01 | 0.00	0.82 | 0.10	0.25 | 0.00	
CV.min	0.43 | 0.03	0.14 | 0.00	0.07 | 0.00	0.85 | 0.14	0.57 | 0.03	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.51 | 0.02	0.83 | 0.07	0.89 | 0.07	0.79 | 0.05		$\rho = 0$
AIC	0.86 | 0.18	0.88 | 0.12	0.89 | 0.08	0.85 | 0.16		$\bar{s}_{Oracle}$ = 91.1
BIC	0.86 | 0.18	0.88 | 0.12	0.89 | 0.08	0.85 | 0.16		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.00 | 0.00	0.86 | 0.06	0.27 | 0.00	
CV.min	0.40 | 0.01	0.18 | 0.00	0.09 | 0.00	0.88 | 0.10	0.54 | 0.01	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.51 | 0.01	0.44 | 0.03	0.90 | 0.06	0.85 | 0.03		$\rho = 0.5$
AIC	0.89 | 0.14	0.89 | 0.11	0.90 | 0.08	0.89 | 0.12		$\bar{s}_{Oracle}$ = 91.1
BIC	0.89 | 0.14	0.90 | 0.10	0.90 | 0.08	0.89 | 0.12		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.55 | 0.01	0.24 | 0.00	
CV.min	0.42 | 0.01	0.27 | 0.00	0.13 | 0.00	0.86 | 0.04	0.55 | 0.01	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.52 | 0.01	0.07 | 0.00	0.90 | 0.07	0.83 | 0.02		$\rho = 0.9$
AIC	0.90 | 0.13	0.90 | 0.10	0.90 | 0.08	0.90 | 0.11		$\bar{s}_{Oracle}$ = 90.5
BIC	0.90 | 0.12	0.90 | 0.10	0.90 | 0.08	0.75 | 0.06		
CV.1se	0.04 | 0.00	0.02 | 0.00	0.02 | 0.00	0.92 | 0.11	0.30 | 0.00	
CV.min	0.42 | 0.02	0.15 | 0.00	0.11 | 0.00	0.93 | 0.16	0.58 | 0.02	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58 | 0.02	0.94 | 0.08	0.95 | 0.08	0.90 | 0.06		$\rho = 0$
AIC	0.94 | 0.20	0.94 | 0.12	0.95 | 0.08	0.93 | 0.18		$\bar{s}_{Oracle}$ = 41.2
BIC	0.94 | 0.20	0.95 | 0.12	0.95 | 0.08	0.93 | 0.18		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.01 | 0.00	0.92 | 0.06	0.32 | 0.00	
CV.min	0.41 | 0.01	0.19 | 0.00	0.10 | 0.00	0.94 | 0.11	0.62 | 0.01	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.54 | 0.01	0.71 | 0.05	0.95 | 0.07	0.92 | 0.04		$\rho = 0.5$
AIC	0.95 | 0.16	0.95 | 0.11	0.95 | 0.08	0.95 | 0.13		$\bar{s}_{Oracle}$ = 41.3
BIC	0.95 | 0.16	0.95 | 0.11	0.95 | 0.08	0.95 | 0.13		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.55 | 0.02	0.29 | 0.00	
CV.min	0.39 | 0.01	0.25 | 0.01	0.10 | 0.00	0.92 | 0.06	0.57 | 0.01	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.54 | 0.02	0.06 | 0.00	0.95 | 0.08	0.89 | 0.04		$\rho = 0.9$
AIC	0.95 | 0.15	0.95 | 0.12	0.96 | 0.10	0.95 | 0.15		$\bar{s}_{Oracle}$ = 39.9
BIC	0.95 | 0.15	0.95 | 0.12	0.96 | 0.10	0.80 | 0.09		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.02 | 0.00	0.98 | 0.12	0.33 | 0.00	
CV.min	0.43 | 0.01	0.14 | 0.00	0.10 | 0.00	0.99 | 0.17	0.64 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.58 | 0.02	0.99 | 0.09	0.99 | 0.08	0.97 | 0.06		$\rho = 0$
AIC	0.99 | 0.21	0.99 | 0.13	0.99 | 0.08	0.99 | 0.18		$\bar{s}_{Oracle}$ = 5.4
BIC	0.99 | 0.20	0.99 | 0.12	0.99 | 0.08	0.99 | 0.18		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.01 | 0.00	0.95 | 0.09	0.33 | 0.00	
CV.min	0.41 | 0.02	0.16 | 0.00	0.10 | 0.00	0.99 | 0.15	0.63 | 0.01	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.01	0.97 | 0.07	0.99 | 0.08	0.96 | 0.05		$\rho = 0.5$
AIC	0.99 | 0.21	0.99 | 0.12	0.99 | 0.09	0.99 | 0.18		$\bar{s}_{Oracle}$ = 5.5
BIC	0.99 | 0.21	0.99 | 0.12	0.99 | 0.08	0.99 | 0.18		
CV.1se	0.01 | 0.00	0.01 | 0.00	0.01 | 0.00	0.57 | 0.04	0.33 | 0.00	
CV.min	0.40 | 0.02	0.23 | 0.01	0.11 | 0.00	0.97 | 0.12	0.61 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.03	0.11 | 0.01	0.99 | 0.13	0.94 | 0.08		$\rho = 0.9$
AIC	0.99 | 0.23	0.99 | 0.18	0.99 | 0.15	0.99 | 0.22		$\bar{s}_{Oracle}$ = 5.3
BIC	0.99 | 0.23	0.99 | 0.18	0.99 | 0.15	0.86 | 0.14		

Table 115: **FDR | Sensitivity for n=100, binary design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.44 | 0.66	0.28 | 0.65	0.05 | 0.44	0.72 | 0.81	0.17 | 0.65	
CV.min	0.80 | 0.88	0.65 | 0.86	0.21 | 0.67	0.85 | 0.87	0.46 | 0.82	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.64 | 0.80	0.47 | 0.81	0.80 | 0.88	0.69 | 0.79		$\rho = 0$
AIC	0.91 | 0.93	0.90 | 0.92	0.88 | 0.88	0.89 | 0.88		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.92	0.90 | 0.92	0.88 | 0.88	0.82 | 0.85		
CV.1se	0.42 | 0.55	0.27 | 0.56	0.05 | 0.36	0.76 | 0.78	0.17 | 0.60	
CV.min	0.80 | 0.83	0.66 | 0.82	0.20 | 0.60	0.86 | 0.84	0.44 | 0.80	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.64 | 0.74	0.50 | 0.77	0.81 | 0.86	0.71 | 0.74		$\rho = 0.5$
AIC	0.92 | 0.92	0.91 | 0.92	0.88 | 0.87	0.90 | 0.86		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.91	0.90 | 0.91	0.88 | 0.87	0.85 | 0.84		
CV.1se	0.42 | 0.51	0.30 | 0.52	0.05 | 0.33	0.77 | 0.75	0.19 | 0.57	
CV.min	0.80 | 0.80	0.68 | 0.78	0.22 | 0.55	0.87 | 0.82	0.47 | 0.75	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.66 | 0.69	0.52 | 0.72	0.81 | 0.82	0.72 | 0.70		$\rho = 0.9$
AIC	0.92 | 0.89	0.91 | 0.89	0.89 | 0.83	0.90 | 0.84		$\bar{s}_{Oracle}$ = 10.0
BIC	0.92 | 0.89	0.91 | 0.89	0.89 | 0.83	0.85 | 0.81		
CV.1se	0.12 | 0.10	0.08 | 0.07	0.02 | 0.03	0.84 | 0.56	0.13 | 0.10	
CV.min	0.64 | 0.40	0.39 | 0.25	0.13 | 0.10	0.91 | 0.62	0.54 | 0.36	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.59 | 0.35	0.44 | 0.29	0.92 | 0.39	0.78 | 0.48		$\rho = 0$
AIC	0.94 | 0.66	0.94 | 0.58	0.94 | 0.42	0.93 | 0.64		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.66	0.94 | 0.58	0.94 | 0.42	0.93 | 0.63		
CV.1se	0.10 | 0.07	0.07 | 0.05	0.03 | 0.03	0.86 | 0.51	0.13 | 0.07	
CV.min	0.62 | 0.34	0.40 | 0.22	0.11 | 0.09	0.92 | 0.58	0.51 | 0.30	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.60 | 0.30	0.43 | 0.25	0.93 | 0.38	0.79 | 0.42		$\rho = 0.5$
AIC	0.94 | 0.63	0.94 | 0.56	0.95 | 0.40	0.94 | 0.60		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.63	0.94 | 0.55	0.95 | 0.40	0.93 | 0.59		
CV.1se	0.11 | 0.07	0.07 | 0.05	0.02 | 0.03	0.86 | 0.48	0.14 | 0.08	
CV.min	0.62 | 0.32	0.41 | 0.21	0.13 | 0.09	0.92 | 0.56	0.51 | 0.28	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.60 | 0.28	0.43 | 0.23	0.93 | 0.36	0.81 | 0.40		$\rho = 0.9$
AIC	0.94 | 0.61	0.94 | 0.55	0.95 | 0.38	0.94 | 0.58		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.61	0.94 | 0.54	0.95 | 0.38	0.93 | 0.58		
CV.1se	0.04 | 0.00	0.02 | 0.00	0.01 | 0.00	0.94 | 0.26	0.26 | 0.01	
CV.min	0.42 | 0.07	0.24 | 0.02	0.11 | 0.01	0.96 | 0.32	0.56 | 0.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.07	0.73 | 0.13	0.97 | 0.15	0.90 | 0.17		$\rho = 0$
AIC	0.97 | 0.36	0.97 | 0.27	0.98 | 0.17	0.96 | 0.34		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.36	0.97 | 0.27	0.98 | 0.17	0.96 | 0.34		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.93 | 0.23	0.32 | 0.01	
CV.min	0.44 | 0.06	0.24 | 0.02	0.11 | 0.01	0.96 | 0.29	0.59 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.55 | 0.06	0.70 | 0.11	0.97 | 0.14	0.91 | 0.15		$\rho = 0.5$
AIC	0.97 | 0.34	0.97 | 0.25	0.98 | 0.16	0.97 | 0.31		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.33	0.97 | 0.25	0.98 | 0.16	0.97 | 0.31		
CV.1se	0.03 | 0.01	0.02 | 0.00	0.01 | 0.00	0.94 | 0.21	0.30 | 0.01	
CV.min	0.46 | 0.06	0.23 | 0.02	0.12 | 0.01	0.96 | 0.27	0.60 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.06	0.65 | 0.10	0.97 | 0.14	0.92 | 0.14		$\rho = 0.9$
AIC	0.97 | 0.32	0.97 | 0.25	0.98 | 0.16	0.97 | 0.30		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.32	0.97 | 0.24	0.98 | 0.16	0.97 | 0.29		

Table 116: **FDR | Sensitivity for n=100, binary design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.43 | 0.69	0.24 | 0.63	0.05 | 0.24	0.74 | 0.92	0.31 | 0.73	
CV.min	0.79 | 0.94	0.61 | 0.91	0.18 | 0.53	0.85 | 0.95	0.65 | 0.93	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.88	0.47 | 0.92	0.81 | 0.90	0.68 | 0.88		$\rho = 0$
AIC	0.91 | 0.98	0.90 | 0.98	0.87 | 0.91	0.89 | 0.96		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.98	0.90 | 0.98	0.87 | 0.91	0.87 | 0.95		
CV.1se	0.37 | 0.52	0.22 | 0.48	0.04 | 0.19	0.77 | 0.88	0.29 | 0.61	
CV.min	0.78 | 0.89	0.60 | 0.84	0.16 | 0.42	0.86 | 0.93	0.62 | 0.87	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.79	0.52 | 0.89	0.82 | 0.88	0.71 | 0.83		$\rho = 0.5$
AIC	0.91 | 0.97	0.90 | 0.97	0.88 | 0.89	0.89 | 0.94		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.97	0.90 | 0.97	0.88 | 0.89	0.88 | 0.94		
CV.1se	0.37 | 0.47	0.24 | 0.43	0.04 | 0.14	0.78 | 0.85	0.31 | 0.55	
CV.min	0.78 | 0.86	0.60 | 0.77	0.17 | 0.36	0.87 | 0.91	0.63 | 0.82	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.64 | 0.75	0.55 | 0.84	0.82 | 0.83	0.72 | 0.79		$\rho = 0.9$
AIC	0.91 | 0.96	0.90 | 0.95	0.89 | 0.84	0.90 | 0.92		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.95	0.90 | 0.95	0.88 | 0.84	0.89 | 0.91		
CV.1se	0.10 | 0.07	0.04 | 0.03	0.01 | 0.01	0.85 | 0.59	0.16 | 0.07	
CV.min	0.60 | 0.38	0.30 | 0.17	0.11 | 0.06	0.91 | 0.67	0.55 | 0.35	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.32	0.61 | 0.36	0.93 | 0.37	0.78 | 0.49		$\rho = 0$
AIC	0.94 | 0.70	0.94 | 0.57	0.95 | 0.39	0.93 | 0.68		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.70	0.94 | 0.57	0.95 | 0.38	0.93 | 0.68		
CV.1se	0.08 | 0.04	0.04 | 0.03	0.01 | 0.01	0.86 | 0.55	0.16 | 0.05	
CV.min	0.56 | 0.30	0.28 | 0.13	0.10 | 0.05	0.92 | 0.62	0.54 | 0.28	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.27	0.60 | 0.31	0.94 | 0.33	0.79 | 0.43		$\rho = 0.5$
AIC	0.94 | 0.67	0.94 | 0.55	0.95 | 0.35	0.93 | 0.64		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.67	0.94 | 0.54	0.95 | 0.35	0.93 | 0.64		
CV.1se	0.08 | 0.04	0.04 | 0.02	0.02 | 0.01	0.87 | 0.51	0.19 | 0.06	
CV.min	0.56 | 0.28	0.29 | 0.12	0.11 | 0.04	0.92 | 0.59	0.56 | 0.26	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.57 | 0.25	0.59 | 0.28	0.94 | 0.33	0.81 | 0.41		$\rho = 0.9$
AIC	0.94 | 0.65	0.94 | 0.53	0.95 | 0.35	0.93 | 0.62		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.65	0.94 | 0.53	0.95 | 0.35	0.93 | 0.61		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.93 | 0.26	0.29 | 0.01	
CV.min	0.44 | 0.06	0.20 | 0.01	0.10 | 0.01	0.96 | 0.32	0.56 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.54 | 0.06	0.92 | 0.17	0.97 | 0.14	0.91 | 0.16		$\rho = 0$
AIC	0.97 | 0.37	0.97 | 0.25	0.98 | 0.15	0.96 | 0.34		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.36	0.97 | 0.25	0.98 | 0.15	0.96 | 0.34		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.94 | 0.23	0.32 | 0.01	
CV.min	0.43 | 0.05	0.19 | 0.01	0.10 | 0.01	0.96 | 0.30	0.59 | 0.05	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.55 | 0.05	0.89 | 0.15	0.98 | 0.13	0.91 | 0.15		$\rho = 0.5$
AIC	0.97 | 0.34	0.97 | 0.23	0.98 | 0.15	0.97 | 0.32		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.34	0.97 | 0.23	0.98 | 0.14	0.97 | 0.32		
CV.1se	0.03 | 0.00	0.03 | 0.00	0.01 | 0.00	0.94 | 0.21	0.30 | 0.01	
CV.min	0.46 | 0.06	0.21 | 0.01	0.10 | 0.01	0.96 | 0.28	0.61 | 0.05	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.58 | 0.05	0.90 | 0.14	0.98 | 0.13	0.92 | 0.14		$\rho = 0.9$
AIC	0.97 | 0.33	0.98 | 0.23	0.98 | 0.15	0.97 | 0.30		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.33	0.98 | 0.22	0.98 | 0.15	0.97 | 0.30		

Table 117: **FDR | Sensitivity for n=100, binary design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.43 | 0.68	0.23 | 0.62	0.05 | 0.23	0.74 | 0.92	0.32 | 0.72	
CV.min	0.79 | 0.94	0.60 | 0.90	0.16 | 0.49	0.85 | 0.96	0.65 | 0.92	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.88	0.47 | 0.93	0.82 | 0.90	0.69 | 0.89		$\rho = 0$
AIC	0.91 | 0.98	0.90 | 0.98	0.87 | 0.90	0.89 | 0.96		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.98	0.89 | 0.98	0.87 | 0.90	0.87 | 0.96		
CV.1se	0.37 | 0.51	0.21 | 0.47	0.04 | 0.16	0.77 | 0.89	0.29 | 0.61	
CV.min	0.77 | 0.88	0.59 | 0.83	0.15 | 0.40	0.86 | 0.94	0.64 | 0.87	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.79	0.51 | 0.90	0.82 | 0.87	0.71 | 0.83		$\rho = 0.5$
AIC	0.91 | 0.97	0.90 | 0.97	0.88 | 0.88	0.89 | 0.94		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.97	0.90 | 0.97	0.88 | 0.88	0.88 | 0.94		
CV.1se	0.37 | 0.46	0.22 | 0.41	0.04 | 0.14	0.78 | 0.86	0.30 | 0.54	
CV.min	0.78 | 0.86	0.59 | 0.76	0.16 | 0.34	0.87 | 0.91	0.64 | 0.83	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.64 | 0.75	0.55 | 0.85	0.83 | 0.82	0.72 | 0.80		$\rho = 0.9$
AIC	0.91 | 0.96	0.90 | 0.95	0.89 | 0.83	0.90 | 0.92		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.95	0.90 | 0.95	0.88 | 0.83	0.88 | 0.92		
CV.1se	0.10 | 0.06	0.04 | 0.03	0.01 | 0.01	0.85 | 0.60	0.17 | 0.07	
CV.min	0.59 | 0.38	0.29 | 0.15	0.11 | 0.05	0.91 | 0.67	0.56 | 0.34	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.55 | 0.32	0.65 | 0.38	0.93 | 0.37	0.78 | 0.49		$\rho = 0$
AIC	0.94 | 0.71	0.94 | 0.57	0.95 | 0.38	0.93 | 0.69		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.71	0.94 | 0.57	0.95 | 0.38	0.93 | 0.68		
CV.1se	0.07 | 0.04	0.04 | 0.03	0.01 | 0.01	0.86 | 0.55	0.18 | 0.05	
CV.min	0.56 | 0.30	0.27 | 0.12	0.10 | 0.05	0.92 | 0.63	0.55 | 0.28	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.27	0.62 | 0.33	0.94 | 0.34	0.79 | 0.44		$\rho = 0.5$
AIC	0.94 | 0.67	0.94 | 0.54	0.95 | 0.36	0.93 | 0.64		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.67	0.94 | 0.54	0.95 | 0.36	0.93 | 0.64		
CV.1se	0.08 | 0.04	0.04 | 0.02	0.02 | 0.01	0.87 | 0.52	0.17 | 0.05	
CV.min	0.56 | 0.28	0.28 | 0.12	0.09 | 0.04	0.92 | 0.59	0.55 | 0.26	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.57 | 0.24	0.61 | 0.30	0.94 | 0.33	0.81 | 0.41		$\rho = 0.9$
AIC	0.94 | 0.65	0.94 | 0.52	0.95 | 0.35	0.93 | 0.62		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.65	0.94 | 0.52	0.95 | 0.34	0.93 | 0.61		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.01 | 0.00	0.93 | 0.26	0.30 | 0.01	
CV.min	0.44 | 0.06	0.21 | 0.01	0.10 | 0.01	0.96 | 0.32	0.57 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.54 | 0.06	0.93 | 0.17	0.97 | 0.14	0.91 | 0.16		$\rho = 0$
AIC	0.97 | 0.37	0.97 | 0.24	0.98 | 0.15	0.96 | 0.34		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.36	0.97 | 0.24	0.98 | 0.15	0.96 | 0.34		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.94 | 0.23	0.30 | 0.01	
CV.min	0.43 | 0.05	0.18 | 0.01	0.10 | 0.01	0.96 | 0.30	0.59 | 0.05	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.05	0.92 | 0.15	0.98 | 0.13	0.91 | 0.15		$\rho = 0.5$
AIC	0.97 | 0.34	0.97 | 0.24	0.98 | 0.15	0.97 | 0.32		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.34	0.97 | 0.23	0.98 | 0.14	0.97 | 0.32		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.94 | 0.21	0.31 | 0.01	
CV.min	0.46 | 0.05	0.20 | 0.01	0.10 | 0.01	0.96 | 0.28	0.61 | 0.05	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.05	0.91 | 0.14	0.98 | 0.13	0.92 | 0.14		$\rho = 0.9$
AIC	0.97 | 0.33	0.98 | 0.22	0.98 | 0.14	0.97 | 0.30		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.33	0.98 | 0.22	0.98 | 0.14	0.97 | 0.30		

Table 118: **FDR | Sensitivity for n=100, binary design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.43 | 0.69	0.23 | 0.61	0.05 | 0.23	0.74 | 0.92	0.32 | 0.72	
CV.min	0.79 | 0.94	0.59 | 0.90	0.17 | 0.50	0.85 | 0.96	0.65 | 0.92	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.88	0.47 | 0.93	0.82 | 0.89	0.69 | 0.89		$\rho = 0$
AIC	0.91 | 0.98	0.90 | 0.98	0.87 | 0.90	0.89 | 0.96		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.98	0.89 | 0.98	0.87 | 0.90	0.87 | 0.96		
CV.1se	0.36 | 0.52	0.20 | 0.46	0.03 | 0.16	0.77 | 0.89	0.29 | 0.61	
CV.min	0.77 | 0.89	0.58 | 0.82	0.15 | 0.40	0.86 | 0.94	0.64 | 0.88	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.80	0.51 | 0.91	0.82 | 0.88	0.71 | 0.84		$\rho = 0.5$
AIC	0.91 | 0.97	0.90 | 0.97	0.88 | 0.88	0.89 | 0.94		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.97	0.90 | 0.97	0.87 | 0.88	0.88 | 0.94		
CV.1se	0.38 | 0.47	0.22 | 0.42	0.04 | 0.14	0.78 | 0.86	0.30 | 0.55	
CV.min	0.78 | 0.86	0.59 | 0.76	0.16 | 0.34	0.87 | 0.91	0.64 | 0.83	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.64 | 0.74	0.55 | 0.85	0.83 | 0.82	0.72 | 0.80		$\rho = 0.9$
AIC	0.91 | 0.96	0.90 | 0.95	0.89 | 0.83	0.90 | 0.92		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.95	0.90 | 0.95	0.88 | 0.83	0.89 | 0.92		
CV.1se	0.10 | 0.07	0.04 | 0.03	0.02 | 0.01	0.85 | 0.59	0.17 | 0.07	
CV.min	0.59 | 0.38	0.28 | 0.15	0.11 | 0.06	0.91 | 0.67	0.55 | 0.34	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.55 | 0.32	0.67 | 0.38	0.93 | 0.37	0.78 | 0.49		$\rho = 0$
AIC	0.94 | 0.71	0.94 | 0.57	0.95 | 0.38	0.93 | 0.68		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.70	0.94 | 0.57	0.95 | 0.38	0.93 | 0.68		
CV.1se	0.08 | 0.04	0.04 | 0.03	0.02 | 0.01	0.87 | 0.54	0.17 | 0.05	
CV.min	0.55 | 0.30	0.27 | 0.12	0.10 | 0.04	0.92 | 0.62	0.53 | 0.28	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.26	0.64 | 0.33	0.94 | 0.34	0.79 | 0.43		$\rho = 0.5$
AIC	0.94 | 0.67	0.94 | 0.54	0.95 | 0.35	0.93 | 0.64		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.67	0.94 | 0.54	0.95 | 0.35	0.93 | 0.64		
CV.1se	0.08 | 0.04	0.04 | 0.02	0.02 | 0.01	0.87 | 0.52	0.19 | 0.05	
CV.min	0.56 | 0.28	0.28 | 0.11	0.10 | 0.04	0.92 | 0.60	0.56 | 0.25	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.24	0.64 | 0.30	0.94 | 0.33	0.81 | 0.41		$\rho = 0.9$
AIC	0.94 | 0.65	0.94 | 0.52	0.95 | 0.35	0.93 | 0.62		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.65	0.94 | 0.52	0.95 | 0.34	0.93 | 0.61		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.02 | 0.00	0.94 | 0.26	0.28 | 0.01	
CV.min	0.43 | 0.06	0.20 | 0.01	0.10 | 0.01	0.96 | 0.32	0.58 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.54 | 0.06	0.94 | 0.17	0.97 | 0.14	0.91 | 0.16		$\rho = 0$
AIC	0.97 | 0.37	0.97 | 0.24	0.98 | 0.15	0.96 | 0.34		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.36	0.97 | 0.23	0.98 | 0.15	0.96 | 0.34		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.94 | 0.23	0.31 | 0.01	
CV.min	0.43 | 0.05	0.18 | 0.01	0.10 | 0.01	0.96 | 0.30	0.58 | 0.05	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.05	0.92 | 0.15	0.98 | 0.13	0.91 | 0.15		$\rho = 0.5$
AIC	0.97 | 0.34	0.97 | 0.23	0.98 | 0.15	0.97 | 0.32		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.34	0.97 | 0.23	0.98 | 0.14	0.97 | 0.32		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.94 | 0.21	0.31 | 0.01	
CV.min	0.46 | 0.05	0.21 | 0.01	0.10 | 0.01	0.96 | 0.28	0.61 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.58 | 0.05	0.92 | 0.15	0.98 | 0.12	0.92 | 0.14		$\rho = 0.9$
AIC	0.97 | 0.33	0.98 | 0.22	0.98 | 0.14	0.97 | 0.30		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.33	0.98 | 0.22	0.98 | 0.14	0.97 | 0.30		

Table 119: **FDR | Sensitivity for n=100, continuous design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.42 | 0.64	0.26 | 0.63	0.05 | 0.42	0.72 | 0.81	0.16 | 0.64	
CV.min	0.78 | 0.87	0.64 | 0.85	0.18 | 0.64	0.85 | 0.87	0.44 | 0.81	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.79	0.34 | 0.73	0.65 | 0.81	0.69 | 0.79		$\rho = 0$
AIC	0.91 | 0.92	0.90 | 0.92	0.88 | 0.88	0.89 | 0.88		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.92	0.90 | 0.92	0.88 | 0.88	0.81 | 0.85		
CV.1se	0.11 | 0.07	0.11 | 0.09	0.03 | 0.08	0.85 | 0.34	0.10 | 0.16	
CV.min	0.69 | 0.26	0.57 | 0.24	0.16 | 0.16	0.93 | 0.44	0.39 | 0.29	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.66 | 0.24	0.22 | 0.15	0.61 | 0.35	0.84 | 0.29		$\rho = 0.5$
AIC	0.95 | 0.57	0.94 | 0.57	0.94 | 0.48	0.94 | 0.48		$\bar{s}_{Oracle}$ = 10.0
BIC	0.95 | 0.57	0.94 | 0.56	0.94 | 0.48	0.83 | 0.42		
CV.1se	0.12 | 0.10	0.09 | 0.10	0.04 | 0.11	0.64 | 0.24	0.04 | 0.12	
CV.min	0.71 | 0.15	0.61 | 0.14	0.23 | 0.13	0.86 | 0.42	0.32 | 0.15	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.72 | 0.14	0.21 | 0.11	0.02 | 0.10	0.82 | 0.31		$\rho = 0.9$
AIC	0.97 | 0.28	0.97 | 0.26	0.97 | 0.23	0.90 | 0.56		$\bar{s}_{Oracle}$ = 10.0
BIC	0.93 | 0.27	0.95 | 0.26	0.97 | 0.23	0.34 | 0.13		
CV.1se	0.11 | 0.10	0.07 | 0.07	0.02 | 0.04	0.84 | 0.55	0.11 | 0.09	
CV.min	0.61 | 0.38	0.39 | 0.25	0.12 | 0.10	0.91 | 0.61	0.51 | 0.34	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.60 | 0.36	0.14 | 0.14	0.92 | 0.41	0.77 | 0.47		$\rho = 0$
AIC	0.94 | 0.66	0.94 | 0.57	0.94 | 0.42	0.93 | 0.63		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.65	0.94 | 0.57	0.94 | 0.42	0.92 | 0.63		
CV.1se	0.05 | 0.02	0.05 | 0.02	0.02 | 0.02	0.89 | 0.24	0.15 | 0.04	
CV.min	0.54 | 0.12	0.40 | 0.09	0.15 | 0.05	0.95 | 0.31	0.46 | 0.11	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.63 | 0.13	0.13 | 0.05	0.91 | 0.22	0.88 | 0.19		$\rho = 0.5$
AIC	0.96 | 0.39	0.97 | 0.34	0.97 | 0.26	0.96 | 0.35		$\bar{s}_{Oracle}$ = 10.0
BIC	0.96 | 0.38	0.97 | 0.34	0.97 | 0.25	0.94 | 0.34		
CV.1se	0.07 | 0.06	0.07 | 0.07	0.03 | 0.08	0.51 | 0.12	0.04 | 0.08	
CV.min	0.66 | 0.12	0.56 | 0.11	0.20 | 0.10	0.89 | 0.20	0.28 | 0.11	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.68 | 0.12	0.16 | 0.10	0.03 | 0.09	0.84 | 0.14		$\rho = 0.9$
AIC	0.98 | 0.24	0.98 | 0.22	0.98 | 0.18	0.95 | 0.41		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.24	0.98 | 0.22	0.98 | 0.18	0.38 | 0.12		
CV.1se	0.04 | 0.01	0.02 | 0.00	0.01 | 0.00	0.93 | 0.25	0.27 | 0.01	
CV.min	0.43 | 0.07	0.24 | 0.03	0.12 | 0.01	0.96 | 0.31	0.58 | 0.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.54 | 0.08	0.19 | 0.03	0.97 | 0.15	0.90 | 0.17		$\rho = 0$
AIC	0.97 | 0.36	0.97 | 0.27	0.98 | 0.17	0.96 | 0.33		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.35	0.97 | 0.26	0.98 | 0.17	0.96 | 0.33		
CV.1se	0.03 | 0.00	0.03 | 0.00	0.01 | 0.00	0.93 | 0.13	0.29 | 0.01	
CV.min	0.43 | 0.03	0.29 | 0.02	0.14 | 0.01	0.97 | 0.18	0.60 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.04	0.08 | 0.01	0.98 | 0.11	0.93 | 0.09		$\rho = 0.5$
AIC	0.98 | 0.23	0.98 | 0.19	0.98 | 0.13	0.98 | 0.21		$\bar{s}_{Oracle}$ = 10.0
BIC	0.98 | 0.23	0.98 | 0.18	0.98 | 0.13	0.98 | 0.21		
CV.1se	0.03 | 0.01	0.03 | 0.01	0.01 | 0.01	0.58 | 0.07	0.18 | 0.02	
CV.min	0.48 | 0.06	0.39 | 0.05	0.16 | 0.03	0.93 | 0.13	0.51 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.61 | 0.07	0.10 | 0.03	0.69 | 0.09	0.89 | 0.10		$\rho = 0.9$
AIC	0.98 | 0.21	0.98 | 0.18	0.98 | 0.14	0.97 | 0.25		$\bar{s}_{Oracle}$ = 10.0
BIC	0.98 | 0.21	0.98 | 0.18	0.98 | 0.14	0.67 | 0.13		

Table 120: **FDR | Sensitivity for n=100, continuous design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.41 | 0.65	0.23 | 0.61	0.05 | 0.26	0.73 | 0.91	0.28 | 0.71	
CV.min	0.78 | 0.93	0.59 | 0.90	0.17 | 0.56	0.84 | 0.94	0.61 | 0.91	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.87	0.33 | 0.83	0.76 | 0.89	0.68 | 0.88		$\rho = 0$
AIC	0.91 | 0.97	0.90 | 0.97	0.87 | 0.90	0.89 | 0.95		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.97	0.90 | 0.97	0.87 | 0.90	0.86 | 0.94		
CV.1se	0.07 | 0.04	0.06 | 0.04	0.02 | 0.03	0.86 | 0.39	0.15 | 0.07	
CV.min	0.60 | 0.23	0.44 | 0.17	0.15 | 0.08	0.93 | 0.49	0.49 | 0.22	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.22	0.14 | 0.09	0.91 | 0.36	0.83 | 0.32		$\rho = 0.5$
AIC	0.95 | 0.60	0.94 | 0.56	0.95 | 0.40	0.94 | 0.53		$\bar{s}_{Oracle}$ = 10.0
BIC	0.95 | 0.60	0.94 | 0.55	0.95 | 0.40	0.93 | 0.52		
CV.1se	0.26 | 0.10	0.23 | 0.11	0.13 | 0.12	0.69 | 0.19	0.12 | 0.14	
CV.min	0.78 | 0.20	0.73 | 0.17	0.33 | 0.15	0.90 | 0.26	0.34 | 0.18	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.77 | 0.19	0.32 | 0.14	0.18 | 0.14	0.84 | 0.21		$\rho = 0.9$
AIC	0.97 | 0.32	0.97 | 0.29	0.97 | 0.23	0.95 | 0.43		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.32	0.97 | 0.29	0.97 | 0.23	0.61 | 0.19		
CV.1se	0.10 | 0.07	0.05 | 0.04	0.01 | 0.02	0.84 | 0.58	0.15 | 0.07	
CV.min	0.58 | 0.37	0.29 | 0.17	0.11 | 0.06	0.91 | 0.66	0.54 | 0.34	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.57 | 0.33	0.16 | 0.12	0.93 | 0.38	0.77 | 0.49		$\rho = 0$
AIC	0.94 | 0.69	0.94 | 0.57	0.95 | 0.39	0.93 | 0.67		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.69	0.94 | 0.57	0.94 | 0.39	0.92 | 0.67		
CV.1se	0.04 | 0.01	0.03 | 0.01	0.02 | 0.01	0.91 | 0.26	0.19 | 0.02	
CV.min	0.48 | 0.10	0.32 | 0.06	0.13 | 0.02	0.95 | 0.34	0.55 | 0.09	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.57 | 0.10	0.12 | 0.03	0.96 | 0.19	0.88 | 0.20		$\rho = 0.5$
AIC	0.96 | 0.40	0.97 | 0.34	0.97 | 0.22	0.96 | 0.37		$\bar{s}_{Oracle}$ = 10.0
BIC	0.96 | 0.40	0.97 | 0.34	0.97 | 0.22	0.96 | 0.37		
CV.1se	0.09 | 0.03	0.09 | 0.03	0.05 | 0.03	0.68 | 0.13	0.17 | 0.05	
CV.min	0.60 | 0.12	0.54 | 0.10	0.24 | 0.07	0.92 | 0.20	0.50 | 0.11	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.68 | 0.12	0.16 | 0.05	0.46 | 0.10	0.88 | 0.16		$\rho = 0.9$
AIC	0.98 | 0.28	0.98 | 0.24	0.98 | 0.19	0.96 | 0.32		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.28	0.98 | 0.24	0.97 | 0.19	0.68 | 0.17		
CV.1se	0.03 | 0.01	0.02 | 0.00	0.02 | 0.00	0.93 | 0.25	0.25 | 0.01	
CV.min	0.42 | 0.07	0.21 | 0.02	0.11 | 0.01	0.96 | 0.32	0.55 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.55 | 0.07	0.51 | 0.09	0.97 | 0.14	0.90 | 0.17		$\rho = 0$
AIC	0.97 | 0.36	0.97 | 0.25	0.98 | 0.16	0.96 | 0.34		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.36	0.97 | 0.25	0.98 | 0.15	0.96 | 0.34		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.93 | 0.13	0.28 | 0.01	
CV.min	0.44 | 0.03	0.26 | 0.01	0.13 | 0.00	0.97 | 0.19	0.59 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.03	0.12 | 0.01	0.98 | 0.10	0.93 | 0.08		$\rho = 0.5$
AIC	0.98 | 0.24	0.98 | 0.18	0.98 | 0.12	0.98 | 0.21		$\bar{s}_{Oracle}$ = 10.0
BIC	0.98 | 0.23	0.98 | 0.18	0.98 | 0.12	0.98 | 0.21		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.02 | 0.00	0.62 | 0.05	0.30 | 0.01	
CV.min	0.45 | 0.03	0.33 | 0.02	0.15 | 0.01	0.94 | 0.11	0.61 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.60 | 0.04	0.08 | 0.00	0.95 | 0.11	0.91 | 0.08		$\rho = 0.9$
AIC	0.98 | 0.21	0.98 | 0.17	0.98 | 0.13	0.98 | 0.20		$\bar{s}_{Oracle}$ = 10.0
BIC	0.98 | 0.21	0.98 | 0.17	0.98 | 0.13	0.84 | 0.13		

Table 121: **FDR | Sensitivity for n=100, continuous design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.41 | 0.66	0.22 | 0.61	0.04 | 0.25	0.73 | 0.91	0.29 | 0.72	
CV.min	0.78 | 0.94	0.58 | 0.89	0.17 | 0.52	0.84 | 0.94	0.62 | 0.91	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.87	0.33 | 0.84	0.78 | 0.89	0.69 | 0.89		$\rho = 0$
AIC	0.91 | 0.97	0.90 | 0.97	0.87 | 0.90	0.89 | 0.95		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.97	0.90 | 0.97	0.87 | 0.90	0.86 | 0.95		
CV.1se	0.07 | 0.04	0.06 | 0.04	0.02 | 0.02	0.86 | 0.39	0.16 | 0.06	
CV.min	0.59 | 0.23	0.43 | 0.17	0.14 | 0.07	0.93 | 0.50	0.50 | 0.22	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.62 | 0.22	0.14 | 0.09	0.91 | 0.36	0.83 | 0.33		$\rho = 0.5$
AIC	0.95 | 0.60	0.94 | 0.55	0.95 | 0.39	0.94 | 0.54		$\bar{s}_{Oracle}$ = 10.0
BIC	0.95 | 0.60	0.94 | 0.55	0.95 | 0.39	0.93 | 0.52		
CV.1se	0.27 | 0.10	0.24 | 0.11	0.13 | 0.11	0.69 | 0.19	0.14 | 0.14	
CV.min	0.79 | 0.20	0.73 | 0.17	0.33 | 0.15	0.89 | 0.26	0.37 | 0.18	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.77 | 0.20	0.33 | 0.14	0.20 | 0.15	0.84 | 0.22		$\rho = 0.9$
AIC	0.97 | 0.32	0.97 | 0.29	0.97 | 0.23	0.95 | 0.42		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.32	0.97 | 0.29	0.97 | 0.23	0.64 | 0.20		
CV.1se	0.10 | 0.07	0.04 | 0.04	0.02 | 0.02	0.84 | 0.59	0.14 | 0.07	
CV.min	0.58 | 0.37	0.28 | 0.16	0.10 | 0.06	0.91 | 0.66	0.54 | 0.34	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.57 | 0.33	0.18 | 0.12	0.93 | 0.37	0.77 | 0.49		$\rho = 0$
AIC	0.94 | 0.70	0.94 | 0.56	0.95 | 0.39	0.93 | 0.67		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.69	0.94 | 0.56	0.94 | 0.39	0.93 | 0.67		
CV.1se	0.04 | 0.01	0.03 | 0.01	0.02 | 0.01	0.91 | 0.26	0.25 | 0.02	
CV.min	0.47 | 0.09	0.30 | 0.05	0.13 | 0.02	0.95 | 0.34	0.56 | 0.09	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.57 | 0.10	0.11 | 0.02	0.96 | 0.19	0.88 | 0.20		$\rho = 0.5$
AIC	0.96 | 0.40	0.97 | 0.34	0.97 | 0.21	0.96 | 0.37		$\bar{s}_{Oracle}$ = 10.0
BIC	0.96 | 0.40	0.97 | 0.33	0.97 | 0.21	0.96 | 0.37		
CV.1se	0.09 | 0.02	0.10 | 0.02	0.05 | 0.03	0.70 | 0.13	0.22 | 0.05	
CV.min	0.59 | 0.11	0.53 | 0.09	0.25 | 0.06	0.92 | 0.20	0.54 | 0.11	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.68 | 0.12	0.17 | 0.04	0.56 | 0.12	0.88 | 0.16		$\rho = 0.9$
AIC	0.97 | 0.28	0.98 | 0.24	0.98 | 0.19	0.96 | 0.31		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.28	0.98 | 0.24	0.98 | 0.19	0.69 | 0.18		
CV.1se	0.03 | 0.01	0.02 | 0.00	0.02 | 0.00	0.93 | 0.25	0.26 | 0.01	
CV.min	0.42 | 0.06	0.21 | 0.02	0.10 | 0.01	0.96 | 0.32	0.57 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.07	0.56 | 0.10	0.97 | 0.14	0.90 | 0.17		$\rho = 0$
AIC	0.97 | 0.36	0.97 | 0.25	0.98 | 0.16	0.96 | 0.34		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.36	0.97 | 0.24	0.98 | 0.15	0.96 | 0.34		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.93 | 0.12	0.30 | 0.00	
CV.min	0.43 | 0.03	0.25 | 0.01	0.13 | 0.00	0.97 | 0.18	0.61 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.03	0.15 | 0.01	0.98 | 0.10	0.93 | 0.08		$\rho = 0.5$
AIC	0.98 | 0.23	0.98 | 0.18	0.98 | 0.12	0.98 | 0.21		$\bar{s}_{Oracle}$ = 10.0
BIC	0.98 | 0.23	0.98 | 0.18	0.98 | 0.11	0.98 | 0.21		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.02 | 0.00	0.62 | 0.05	0.28 | 0.01	
CV.min	0.45 | 0.03	0.33 | 0.02	0.14 | 0.01	0.94 | 0.11	0.59 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.60 | 0.03	0.07 | 0.00	0.97 | 0.11	0.91 | 0.07		$\rho = 0.9$
AIC	0.98 | 0.21	0.98 | 0.17	0.98 | 0.13	0.98 | 0.20		$\bar{s}_{Oracle}$ = 10.0
BIC	0.98 | 0.21	0.98 | 0.17	0.98 | 0.13	0.83 | 0.13		

Table 122: **FDR | Sensitivity for n=100, continuous design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.41 | 0.65	0.21 | 0.61	0.04 | 0.25	0.73 | 0.91	0.29 | 0.72	
CV.min	0.79 | 0.94	0.58 | 0.90	0.16 | 0.54	0.84 | 0.95	0.61 | 0.91	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.87	0.32 | 0.84	0.79 | 0.90	0.69 | 0.89		$\rho = 0$
AIC	0.91 | 0.98	0.90 | 0.97	0.87 | 0.91	0.89 | 0.95		$\bar{s}_{Oracle}$ = 10.0
BIC	0.91 | 0.97	0.89 | 0.97	0.87 | 0.91	0.86 | 0.95		
CV.1se	0.07 | 0.04	0.06 | 0.04	0.02 | 0.03	0.86 | 0.39	0.16 | 0.06	
CV.min	0.59 | 0.23	0.42 | 0.16	0.14 | 0.07	0.93 | 0.50	0.49 | 0.21	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.62 | 0.22	0.14 | 0.09	0.91 | 0.35	0.83 | 0.33		$\rho = 0.5$
AIC	0.95 | 0.60	0.94 | 0.55	0.95 | 0.38	0.94 | 0.54		$\bar{s}_{Oracle}$ = 10.0
BIC	0.95 | 0.60	0.94 | 0.54	0.95 | 0.38	0.92 | 0.52		
CV.1se	0.28 | 0.10	0.24 | 0.11	0.13 | 0.11	0.69 | 0.20	0.14 | 0.14	
CV.min	0.79 | 0.20	0.72 | 0.17	0.33 | 0.15	0.89 | 0.26	0.37 | 0.18	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.77 | 0.20	0.34 | 0.14	0.23 | 0.15	0.84 | 0.22		$\rho = 0.9$
AIC	0.97 | 0.32	0.97 | 0.29	0.97 | 0.23	0.95 | 0.41		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.32	0.97 | 0.29	0.97 | 0.23	0.64 | 0.21		
CV.1se	0.10 | 0.07	0.04 | 0.04	0.01 | 0.02	0.84 | 0.59	0.15 | 0.07	
CV.min	0.58 | 0.38	0.28 | 0.16	0.11 | 0.06	0.91 | 0.66	0.53 | 0.35	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.33	0.19 | 0.13	0.93 | 0.37	0.77 | 0.49		$\rho = 0$
AIC	0.94 | 0.70	0.94 | 0.56	0.95 | 0.39	0.93 | 0.67		$\bar{s}_{Oracle}$ = 10.0
BIC	0.94 | 0.70	0.94 | 0.56	0.94 | 0.38	0.92 | 0.67		
CV.1se	0.04 | 0.01	0.03 | 0.01	0.02 | 0.01	0.90 | 0.26	0.23 | 0.02	
CV.min	0.48 | 0.10	0.30 | 0.05	0.13 | 0.02	0.95 | 0.34	0.56 | 0.09	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58 | 0.10	0.10 | 0.02	0.96 | 0.19	0.88 | 0.20		$\rho = 0.5$
AIC	0.96 | 0.41	0.97 | 0.34	0.97 | 0.21	0.96 | 0.37		$\bar{s}_{Oracle}$ = 10.0
BIC	0.96 | 0.40	0.97 | 0.33	0.97 | 0.21	0.96 | 0.37		
CV.1se	0.09 | 0.02	0.09 | 0.02	0.05 | 0.03	0.70 | 0.13	0.22 | 0.05	
CV.min	0.59 | 0.11	0.53 | 0.10	0.25 | 0.06	0.92 | 0.20	0.53 | 0.11	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.68 | 0.12	0.17 | 0.04	0.58 | 0.12	0.88 | 0.17		$\rho = 0.9$
AIC	0.97 | 0.28	0.98 | 0.24	0.98 | 0.20	0.96 | 0.31		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.28	0.98 | 0.24	0.97 | 0.20	0.72 | 0.18		
CV.1se	0.03 | 0.01	0.02 | 0.00	0.01 | 0.00	0.93 | 0.25	0.25 | 0.01	
CV.min	0.42 | 0.06	0.20 | 0.02	0.10 | 0.01	0.96 | 0.32	0.56 | 0.06	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.55 | 0.07	0.58 | 0.11	0.97 | 0.14	0.90 | 0.17		$\rho = 0$
AIC	0.97 | 0.36	0.97 | 0.24	0.98 | 0.15	0.96 | 0.34		$\bar{s}_{Oracle}$ = 10.0
BIC	0.97 | 0.36	0.97 | 0.24	0.98 | 0.15	0.96 | 0.34		
CV.1se	0.02 | 0.00	0.02 | 0.00	0.01 | 0.00	0.93 | 0.12	0.30 | 0.00	
CV.min	0.43 | 0.03	0.25 | 0.01	0.13 | 0.00	0.97 | 0.18	0.62 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.03	0.16 | 0.01	0.98 | 0.10	0.93 | 0.08		$\rho = 0.5$
AIC	0.98 | 0.23	0.98 | 0.18	0.98 | 0.11	0.98 | 0.21		$\bar{s}_{Oracle}$ = 10.0
BIC	0.98 | 0.23	0.98 | 0.17	0.98 | 0.11	0.98 | 0.21		
CV.1se	0.03 | 0.00	0.02 | 0.00	0.01 | 0.00	0.61 | 0.05	0.28 | 0.01	
CV.min	0.45 | 0.03	0.33 | 0.02	0.15 | 0.01	0.93 | 0.10	0.60 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.60 | 0.03	0.08 | 0.00	0.97 | 0.11	0.91 | 0.07		$\rho = 0.9$
AIC	0.98 | 0.20	0.98 | 0.17	0.98 | 0.13	0.98 | 0.20		$\bar{s}_{Oracle}$ = 10.0
BIC	0.98 | 0.20	0.98 | 0.17	0.98 | 0.12	0.83 | 0.12		

Table 123: **FDR | Sensitivity for n=1000, binary design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.36 | 0.74	0.20 | 0.71	0.01 | 0.60	0.23 | 0.65	0.01 | 0.57	
CV.min	0.72 | 0.85	0.64 | 0.82	0.22 | 0.73	0.54 | 0.72	0.20 | 0.71	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.70 | 0.84	0.63 | 0.82	0.36 | 0.76	0.52 | 0.72		$\rho = 0$
AIC	0.95 | 0.95	0.95 | 0.95	0.95 | 0.94	0.53 | 0.72		$\bar{s}_{Oracle}$ = 33.3
BIC	0.22 | 0.71	0.14 | 0.69	0.01 | 0.61	0.17 | 0.63		
CV.1se	0.41 | 0.74	0.25 | 0.71	0.02 | 0.60	0.28 | 0.65	0.01 | 0.57	
CV.min	0.74 | 0.84	0.66 | 0.82	0.25 | 0.72	0.56 | 0.72	0.21 | 0.71	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.72 | 0.84	0.65 | 0.82	0.39 | 0.77	0.54 | 0.71		$\rho = 0.5$
AIC	0.95 | 0.96	0.95 | 0.95	0.95 | 0.94	0.55 | 0.71		$\bar{s}_{Oracle}$ = 33.3
BIC	0.24 | 0.70	0.15 | 0.68	0.01 | 0.60	0.20 | 0.62		
CV.1se	0.45 | 0.74	0.28 | 0.71	0.03 | 0.60	0.30 | 0.64	0.01 | 0.58	
CV.min	0.75 | 0.84	0.68 | 0.82	0.28 | 0.72	0.57 | 0.71	0.23 | 0.71	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.73 | 0.83	0.66 | 0.81	0.40 | 0.76	0.55 | 0.70		$\rho = 0.9$
AIC	0.95 | 0.96	0.95 | 0.96	0.95 | 0.94	0.56 | 0.71		$\bar{s}_{Oracle}$ = 33.1
BIC	0.27 | 0.69	0.17 | 0.68	0.02 | 0.60	0.22 | 0.61		
CV.1se	0.27 | 0.64	0.13 | 0.59	0.01 | 0.47	0.45 | 0.67	0.01 | 0.46	
CV.min	0.72 | 0.79	0.61 | 0.76	0.14 | 0.61	0.81 | 0.81	0.26 | 0.65	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.72 | 0.79	0.63 | 0.77	0.34 | 0.67	0.77 | 0.79		$\rho = 0$
AIC	0.97 | 0.95	0.97 | 0.95	0.97 | 0.93	0.85 | 0.83		$\bar{s}_{Oracle}$ = 26.3
BIC	0.19 | 0.61	0.10 | 0.58	0.00 | 0.45	0.16 | 0.57		
CV.1se	0.31 | 0.62	0.16 | 0.58	0.01 | 0.47	0.50 | 0.67	0.01 | 0.46	
CV.min	0.74 | 0.78	0.64 | 0.74	0.15 | 0.60	0.82 | 0.80	0.24 | 0.62	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.73 | 0.78	0.65 | 0.75	0.37 | 0.67	0.78 | 0.77		$\rho = 0.5$
AIC	0.97 | 0.95	0.97 | 0.95	0.96 | 0.93	0.86 | 0.82		$\bar{s}_{Oracle}$ = 26.4
BIC	0.21 | 0.59	0.12 | 0.56	0.01 | 0.45	0.19 | 0.56		
CV.1se	0.35 | 0.63	0.19 | 0.58	0.02 | 0.47	0.51 | 0.66	0.01 | 0.46	
CV.min	0.75 | 0.79	0.66 | 0.75	0.18 | 0.60	0.81 | 0.79	0.27 | 0.63	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.74 | 0.79	0.67 | 0.76	0.39 | 0.68	0.79 | 0.77		$\rho = 0.9$
AIC	0.97 | 0.95	0.97 | 0.95	0.96 | 0.93	0.85 | 0.82		$\bar{s}_{Oracle}$ = 26.1
BIC	0.23 | 0.59	0.13 | 0.56	0.01 | 0.45	0.21 | 0.56		
CV.1se	0.12 | 0.38	0.06 | 0.34	0.01 | 0.26	0.62 | 0.62	0.01 | 0.27	
CV.min	0.70 | 0.66	0.54 | 0.59	0.14 | 0.43	0.88 | 0.79	0.38 | 0.53	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.73 | 0.69	0.60 | 0.63	0.22 | 0.43	0.85 | 0.76		$\rho = 0$
AIC	0.98 | 0.94	0.98 | 0.94	0.98 | 0.91	0.94 | 0.88		$\bar{s}_{Oracle}$ = 19.7
BIC	0.13 | 0.40	0.06 | 0.36	0.00 | 0.18	0.17 | 0.44		
CV.1se	0.14 | 0.36	0.08 | 0.33	0.01 | 0.26	0.66 | 0.62	0.01 | 0.26	
CV.min	0.72 | 0.66	0.59 | 0.59	0.14 | 0.42	0.89 | 0.79	0.36 | 0.51	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.75 | 0.68	0.64 | 0.63	0.26 | 0.45	0.85 | 0.75		$\rho = 0.5$
AIC	0.98 | 0.95	0.98 | 0.94	0.98 | 0.92	0.95 | 0.88		$\bar{s}_{Oracle}$ = 19.4
BIC	0.13 | 0.37	0.07 | 0.34	0.00 | 0.18	0.19 | 0.41		
CV.1se	0.16 | 0.36	0.09 | 0.32	0.02 | 0.24	0.65 | 0.60	0.02 | 0.26	
CV.min	0.74 | 0.65	0.61 | 0.58	0.16 | 0.40	0.89 | 0.77	0.37 | 0.50	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.76 | 0.66	0.66 | 0.62	0.28 | 0.44	0.86 | 0.73		$\rho = 0.9$
AIC	0.98 | 0.95	0.98 | 0.94	0.98 | 0.92	0.94 | 0.86		$\bar{s}_{Oracle}$ = 19.7
BIC	0.14 | 0.35	0.07 | 0.32	0.00 | 0.17	0.21 | 0.40		

Table 124: **FDR | Sensitivity for n=1000, binary design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.49 | 0.76	0.36 | 0.71	0.07 | 0.56	0.43 | 0.66	0.15 | 0.61	
CV.min	0.64 | 0.83	0.56 | 0.80	0.19 | 0.65	0.57 | 0.74	0.39 | 0.74	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.55 | 0.79	0.48 | 0.77	0.43 | 0.75	0.53 | 0.71		$\rho = 0$
AIC	0.84 | 0.94	0.84 | 0.94	0.84 | 0.91	0.63 | 0.77		$\bar{s}_{Oracle}$ = 124.2
BIC	0.22 | 0.59	0.13 | 0.56	0.02 | 0.47	0.22 | 0.54		
CV.1se	0.52 | 0.76	0.39 | 0.71	0.08 | 0.56	0.47 | 0.66	0.13 | 0.60	
CV.min	0.66 | 0.84	0.58 | 0.80	0.21 | 0.65	0.59 | 0.73	0.38 | 0.73	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.57 | 0.78	0.50 | 0.77	0.44 | 0.76	0.55 | 0.71		$\rho = 0.5$
AIC	0.84 | 0.94	0.84 | 0.94	0.84 | 0.92	0.65 | 0.77		$\bar{s}_{Oracle}$ = 123.8
BIC	0.23 | 0.57	0.15 | 0.55	0.02 | 0.47	0.25 | 0.53		
CV.1se	0.54 | 0.76	0.41 | 0.71	0.10 | 0.56	0.48 | 0.65	0.16 | 0.60	
CV.min	0.67 | 0.84	0.59 | 0.80	0.24 | 0.65	0.60 | 0.73	0.39 | 0.73	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.58 | 0.78	0.51 | 0.77	0.45 | 0.75	0.56 | 0.70		$\rho = 0.9$
AIC	0.84 | 0.94	0.84 | 0.94	0.84 | 0.91	0.65 | 0.76		$\bar{s}_{Oracle}$ = 123.6
BIC	0.25 | 0.56	0.16 | 0.55	0.03 | 0.47	0.27 | 0.52		
CV.1se	0.43 | 0.58	0.27 | 0.50	0.07 | 0.34	0.52 | 0.62	0.26 | 0.50	
CV.min	0.66 | 0.73	0.54 | 0.66	0.20 | 0.46	0.68 | 0.73	0.57 | 0.68	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.60 | 0.69	0.55 | 0.67	0.62 | 0.69	0.62 | 0.69		$\rho = 0$
AIC	0.90 | 0.94	0.90 | 0.92	0.90 | 0.90	0.79 | 0.82		$\bar{s}_{Oracle}$ = 90.2
BIC	0.08 | 0.24	0.06 | 0.29	0.01 | 0.12	0.17 | 0.38		
CV.1se	0.46 | 0.57	0.31 | 0.49	0.08 | 0.34	0.55 | 0.61	0.23 | 0.46	
CV.min	0.67 | 0.73	0.56 | 0.66	0.21 | 0.46	0.69 | 0.72	0.55 | 0.66	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.61 | 0.68	0.56 | 0.66	0.62 | 0.69	0.64 | 0.68		$\rho = 0.5$
AIC	0.90 | 0.94	0.90 | 0.93	0.90 | 0.90	0.80 | 0.82		$\bar{s}_{Oracle}$ = 90.2
BIC	0.06 | 0.17	0.07 | 0.26	0.01 | 0.12	0.18 | 0.35		
CV.1se	0.48 | 0.57	0.34 | 0.50	0.10 | 0.33	0.56 | 0.61	0.26 | 0.47	
CV.min	0.68 | 0.73	0.58 | 0.67	0.24 | 0.46	0.69 | 0.71	0.56 | 0.66	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.62 | 0.69	0.57 | 0.67	0.63 | 0.69	0.65 | 0.68		$\rho = 0.9$
AIC	0.90 | 0.94	0.90 | 0.93	0.90 | 0.90	0.80 | 0.81		$\bar{s}_{Oracle}$ = 89.2
BIC	0.06 | 0.16	0.08 | 0.24	0.01 | 0.10	0.20 | 0.34		
CV.1se	0.08 | 0.06	0.03 | 0.02	0.00 | 0.01	0.65 | 0.44	0.09 | 0.04	
CV.min	0.61 | 0.41	0.34 | 0.21	0.07 | 0.05	0.80 | 0.64	0.59 | 0.40	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.64 | 0.43	0.63 | 0.43	0.23 | 0.16	0.76 | 0.57		$\rho = 0$
AIC	0.94 | 0.92	0.94 | 0.90	0.94 | 0.90	0.90 | 0.81		$\bar{s}_{Oracle}$ = 56.2
BIC	0.01 | 0.01	0.00 | 0.01	0.00 | 0.00	0.06 | 0.04		
CV.1se	0.07 | 0.04	0.03 | 0.02	0.00 | 0.00	0.67 | 0.42	0.08 | 0.03	
CV.min	0.60 | 0.36	0.34 | 0.19	0.08 | 0.04	0.81 | 0.61	0.57 | 0.35	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.64 | 0.39	0.63 | 0.41	0.29 | 0.20	0.77 | 0.55		$\rho = 0.5$
AIC	0.94 | 0.92	0.94 | 0.91	0.94 | 0.90	0.90 | 0.81		$\bar{s}_{Oracle}$ = 56.2
BIC	0.01 | 0.01	0.01 | 0.01	0.00 | 0.00	0.06 | 0.03		
CV.1se	0.07 | 0.03	0.03 | 0.01	0.00 | 0.00	0.67 | 0.41	0.07 | 0.03	
CV.min	0.61 | 0.36	0.37 | 0.18	0.09 | 0.04	0.81 | 0.60	0.58 | 0.34	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.66 | 0.40	0.64 | 0.41	0.27 | 0.19	0.77 | 0.54		$\rho = 0.9$
AIC	0.94 | 0.92	0.94 | 0.91	0.94 | 0.90	0.90 | 0.80		$\bar{s}_{Oracle}$ = 56.5
BIC	0.01 | 0.01	0.01 | 0.01	0.00 | 0.00	0.07 | 0.03		

Table 125: **FDR | Sensitivity for n=1000, binary design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.47 | 0.74	0.36 | 0.68	0.15 | 0.52	0.41 | 0.64	0.38 | 0.70	$\mathrm{sd}(\mu)/\sigma = 2$, $\rho = 0$, $\bar{s}_{Oracle}$ = 208.7
CV.min	0.58 | 0.82	0.50 | 0.78	0.26 | 0.62	0.51 | 0.71	0.54 | 0.80	
AICc	0.46 | 0.73	0.41 | 0.71	0.41 | 0.71	0.45 | 0.67		
AIC	0.75 | 0.93	0.75 | 0.92	0.75 | 0.89	0.57 | 0.76		
BIC	0.06 | 0.20	0.09 | 0.38	0.08 | 0.43	0.18 | 0.42		
CV.1se	0.49 | 0.74	0.39 | 0.68	0.16 | 0.52	0.44 | 0.63	0.36 | 0.68	$\mathrm{sd}(\mu)/\sigma = 2$, $\rho = 0.5$, $\bar{s}_{Oracle}$ = 208.8
CV.min	0.59 | 0.82	0.52 | 0.78	0.27 | 0.62	0.52 | 0.71	0.52 | 0.79	
AICc	0.48 | 0.72	0.42 | 0.71	0.40 | 0.71	0.47 | 0.66		
AIC	0.75 | 0.93	0.75 | 0.93	0.75 | 0.90	0.58 | 0.76		
BIC	0.03 | 0.10	0.10 | 0.35	0.09 | 0.43	0.20 | 0.39		
CV.1se	0.50 | 0.74	0.40 | 0.68	0.18 | 0.52	0.44 | 0.62	0.38 | 0.68	$\mathrm{sd}(\mu)/\sigma = 2$, $\rho = 0.9$, $\bar{s}_{Oracle}$ = 209.4
CV.min	0.60 | 0.82	0.52 | 0.78	0.29 | 0.62	0.53 | 0.70	0.53 | 0.79	
AICc	0.48 | 0.72	0.43 | 0.71	0.41 | 0.70	0.47 | 0.65		
AIC	0.75 | 0.93	0.75 | 0.93	0.75 | 0.90	0.59 | 0.75		
BIC	0.03 | 0.08	0.11 | 0.33	0.11 | 0.43	0.21 | 0.38		
CV.1se	0.41 | 0.47	0.25 | 0.33	0.06 | 0.10	0.51 | 0.56	0.40 | 0.47	$\mathrm{sd}(\mu)/\sigma = 1$, $\rho = 0$, $\bar{s}_{Oracle}$ = 143.3
CV.min	0.60 | 0.67	0.47 | 0.54	0.18 | 0.24	0.62 | 0.67	0.60 | 0.67	
AICc	0.53 | 0.59	0.51 | 0.58	0.61 | 0.61	0.56 | 0.61		
AIC	0.84 | 0.92	0.84 | 0.91	0.85 | 0.89	0.74 | 0.80		
BIC	0.00 | 0.01	0.01 | 0.02	0.00 | 0.00	0.05 | 0.09		
CV.1se	0.42 | 0.45	0.27 | 0.32	0.06 | 0.09	0.53 | 0.54	0.41 | 0.44	$\mathrm{sd}(\mu)/\sigma = 1$, $\rho = 0.5$, $\bar{s}_{Oracle}$ = 144.0
CV.min	0.62 | 0.66	0.49 | 0.54	0.17 | 0.22	0.63 | 0.66	0.61 | 0.66	
AICc	0.54 | 0.57	0.52 | 0.57	0.61 | 0.61	0.58 | 0.60		
AIC	0.84 | 0.93	0.84 | 0.91	0.85 | 0.89	0.75 | 0.79		
BIC	0.00 | 0.01	0.01 | 0.01	0.00 | 0.00	0.05 | 0.06		
CV.1se	0.44 | 0.45	0.30 | 0.32	0.06 | 0.07	0.54 | 0.53	0.42 | 0.43	$\mathrm{sd}(\mu)/\sigma = 1$, $\rho = 0.9$, $\bar{s}_{Oracle}$ = 143.6
CV.min	0.62 | 0.66	0.51 | 0.54	0.19 | 0.22	0.63 | 0.65	0.62 | 0.66	
AICc	0.55 | 0.56	0.53 | 0.57	0.61 | 0.61	0.59 | 0.59		
AIC	0.84 | 0.93	0.84 | 0.91	0.85 | 0.89	0.75 | 0.79		
BIC	0.00 | 0.00	0.00 | 0.01	0.00 | 0.00	0.05 | 0.06		
CV.1se	0.04 | 0.01	0.01 | 0.00	0.00 | 0.00	0.67 | 0.33	0.14 | 0.01	$\mathrm{sd}(\mu)/\sigma = 0.5$, $\rho = 0$, $\bar{s}_{Oracle}$ = 77.9
CV.min	0.54 | 0.23	0.20 | 0.05	0.06 | 0.01	0.79 | 0.53	0.54 | 0.23	
AICc	0.60 | 0.27	0.64 | 0.33	0.15 | 0.09	0.75 | 0.44		
AIC	0.92 | 0.91	0.92 | 0.89	0.92 | 0.90	0.88 | 0.76		
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.05 | 0.01		
CV.1se	0.03 | 0.01	0.00 | 0.00	0.00 | 0.00	0.68 | 0.31	0.15 | 0.01	$\mathrm{sd}(\mu)/\sigma = 0.5$, $\rho = 0.5$, $\bar{s}_{Oracle}$ = 78.0
CV.min	0.51 | 0.18	0.19 | 0.04	0.06 | 0.01	0.80 | 0.51	0.51 | 0.17	
AICc	0.59 | 0.23	0.61 | 0.30	0.17 | 0.10	0.76 | 0.43		
AIC	0.92 | 0.92	0.92 | 0.90	0.92 | 0.90	0.89 | 0.77		
BIC	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.06 | 0.01		
CV.1se	0.02 | 0.01	0.01 | 0.00	0.00 | 0.00	0.69 | 0.29	0.14 | 0.01	$\mathrm{sd}(\mu)/\sigma = 0.5$, $\rho = 0.9$, $\bar{s}_{Oracle}$ = 77.5
CV.min	0.50 | 0.17	0.19 | 0.04	0.07 | 0.01	0.80 | 0.49	0.52 | 0.17	
AICc	0.60 | 0.23	0.62 | 0.29	0.16 | 0.09	0.76 | 0.41		
AIC	0.92 | 0.91	0.92 | 0.89	0.92 | 0.90	0.89 | 0.76		
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.07 | 0.01		

Table 126: **FDR | Sensitivity for n=1000, binary design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.44 | 0.72	0.35 | 0.62	0.22 | 0.39	0.39 | 0.62	0.46 | 0.75	
CV.min	0.53 | 0.82	0.46 | 0.75	0.33 | 0.55	0.46 | 0.70	0.55 | 0.84	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.39 | 0.65	0.37 | 0.64	0.42 | 0.66	0.39 | 0.62		$\rho = 0$
AIC	0.67 | 0.93	0.67 | 0.92	0.67 | 0.88	0.52 | 0.77		
BIC	0.00 | 0.00	0.00 | 0.01	0.13 | 0.23	0.03 | 0.04		$\bar{s}_{Oracle}$ = 293.1
CV.1se	0.45 | 0.71	0.37 | 0.61	0.22 | 0.38	0.41 | 0.60	0.46 | 0.74	
CV.min	0.54 | 0.82	0.47 | 0.75	0.33 | 0.54	0.47 | 0.69	0.55 | 0.84	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.40 | 0.63	0.38 | 0.64	0.42 | 0.66	0.41 | 0.61		$\rho = 0.5$
AIC	0.67 | 0.93	0.67 | 0.92	0.67 | 0.89	0.53 | 0.76		
BIC	0.00 | 0.00	0.00 | 0.00	0.11 | 0.19	0.02 | 0.03		$\bar{s}_{Oracle}$ = 293.7
CV.1se	0.46 | 0.72	0.38 | 0.61	0.23 | 0.36	0.41 | 0.59	0.47 | 0.74	
CV.min	0.54 | 0.82	0.47 | 0.75	0.34 | 0.54	0.47 | 0.68	0.56 | 0.84	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.40 | 0.63	0.38 | 0.63	0.42 | 0.66	0.41 | 0.59		$\rho = 0.9$
AIC	0.67 | 0.93	0.67 | 0.92	0.67 | 0.89	0.53 | 0.76		
BIC	0.00 | 0.00	0.00 | 0.00	0.11 | 0.17	0.02 | 0.02		$\bar{s}_{Oracle}$ = 293.3
CV.1se	0.35 | 0.28	0.12 | 0.08	0.00 | 0.00	0.48 | 0.44	0.36 | 0.29	
CV.min	0.54 | 0.54	0.34 | 0.28	0.05 | 0.02	0.56 | 0.57	0.55 | 0.55	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.46 | 0.41	0.49 | 0.45	0.60 | 0.51	0.51 | 0.48		$\rho = 0$
AIC	0.77 | 0.91	0.77 | 0.89	0.78 | 0.88	0.68 | 0.75		
BIC	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.02 | 0.01		$\bar{s}_{Oracle}$ = 217.0
CV.1se	0.33 | 0.23	0.09 | 0.05	0.00 | 0.00	0.50 | 0.43	0.34 | 0.24	
CV.min	0.55 | 0.52	0.33 | 0.23	0.04 | 0.01	0.58 | 0.56	0.55 | 0.52	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.47 | 0.38	0.50 | 0.44	0.60 | 0.52	0.52 | 0.47		$\rho = 0.5$
AIC	0.77 | 0.91	0.77 | 0.89	0.78 | 0.88	0.69 | 0.75		
BIC	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.02 | 0.01		$\bar{s}_{Oracle}$ = 214.8
CV.1se	0.34 | 0.22	0.10 | 0.05	0.00 | 0.00	0.51 | 0.42	0.35 | 0.23	
CV.min	0.55 | 0.51	0.35 | 0.24	0.04 | 0.01	0.58 | 0.55	0.55 | 0.52	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.48 | 0.38	0.51 | 0.43	0.60 | 0.51	0.53 | 0.46		$\rho = 0.9$
AIC	0.77 | 0.91	0.77 | 0.89	0.78 | 0.88	0.69 | 0.74		
BIC	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.02 | 0.01		$\bar{s}_{Oracle}$ = 215.0
CV.1se	0.03 | 0.00	0.00 | 0.00	0.00 | 0.00	0.72 | 0.24	0.22 | 0.01	
CV.min	0.51 | 0.12	0.16 | 0.01	0.07 | 0.00	0.81 | 0.43	0.54 | 0.12	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.61 | 0.15	0.68 | 0.27	0.07 | 0.04	0.78 | 0.35		$\rho = 0$
AIC	0.91 | 0.91	0.91 | 0.89	0.91 | 0.91	0.88 | 0.71		
BIC	0.01 | 0.00	0.00 | 0.00	0.02 | 0.02	0.09 | 0.00		$\bar{s}_{Oracle}$ = 90.7
CV.1se	0.02 | 0.00	0.00 | 0.00	0.00 | 0.00	0.73 | 0.23	0.24 | 0.00	
CV.min	0.47 | 0.09	0.15 | 0.01	0.07 | 0.00	0.81 | 0.41	0.52 | 0.09	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.59 | 0.12	0.65 | 0.24	0.07 | 0.04	0.78 | 0.33		$\rho = 0.5$
AIC	0.91 | 0.91	0.91 | 0.89	0.91 | 0.91	0.88 | 0.71		
BIC	0.01 | 0.00	0.00 | 0.00	0.01 | 0.01	0.07 | 0.00		$\bar{s}_{Oracle}$ = 91.4
CV.1se	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.72 | 0.21	0.24 | 0.00	
CV.min	0.47 | 0.09	0.16 | 0.01	0.06 | 0.00	0.81 | 0.40	0.51 | 0.08	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.58 | 0.12	0.65 | 0.24	0.07 | 0.04	0.79 | 0.32		$\rho = 0.9$
AIC	0.91 | 0.90	0.91 | 0.89	0.91 | 0.90	0.88 | 0.71		
BIC	0.01 | 0.00	0.00 | 0.00	0.01 | 0.01	0.09 | 0.00		$\bar{s}_{Oracle}$ = 89.5

Table 127: **FDR | Sensitivity for n=1000, continuous design, dense covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.36 | 0.74	0.21 | 0.71	0.02 | 0.60	0.24 | 0.65	0.00 | 0.57	
CV.min	0.72 | 0.85	0.64 | 0.83	0.22 | 0.72	0.55 | 0.73	0.20 | 0.71	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.70 | 0.84	0.60 | 0.82	0.10 | 0.67	0.52 | 0.72		$\rho = 0$
AIC	0.95 | 0.95	0.95 | 0.95	0.95 | 0.94	0.53 | 0.72		$\bar{s}_{Oracle}$ = 33.2
BIC	0.22 | 0.70	0.12 | 0.68	0.00 | 0.57	0.18 | 0.63		
CV.1se	0.72 | 0.70	0.61 | 0.66	0.17 | 0.56	0.51 | 0.51	0.04 | 0.55	
CV.min	0.85 | 0.81	0.81 | 0.77	0.53 | 0.67	0.60 | 0.55	0.25 | 0.63	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.82 | 0.78	0.78 | 0.75	0.44 | 0.65	0.60 | 0.55		$\rho = 0.5$
AIC	0.94 | 0.95	0.94 | 0.95	0.94 | 0.94	0.60 | 0.55		$\bar{s}_{Oracle}$ = 32.9
BIC	0.49 | 0.59	0.36 | 0.57	0.05 | 0.49	0.49 | 0.51		
CV.1se	0.87 | 0.65	0.85 | 0.60	0.73 | 0.50	0.04 | 0.37	0.48 | 0.50	
CV.min	0.90 | 0.76	0.89 | 0.73	0.81 | 0.60	0.06 | 0.39	0.66 | 0.57	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.89 | 0.72	0.87 | 0.68	0.78 | 0.57	0.06 | 0.39		$\rho = 0.9$
AIC	0.90 | 0.79	0.90 | 0.79	0.88 | 0.77	0.06 | 0.39		$\bar{s}_{Oracle}$ = 30.4
BIC	0.80 | 0.43	0.78 | 0.40	0.49 | 0.31	0.06 | 0.39		
CV.1se	0.27 | 0.64	0.13 | 0.59	0.01 | 0.48	0.47 | 0.68	0.01 | 0.47	
CV.min	0.72 | 0.79	0.61 | 0.76	0.15 | 0.61	0.81 | 0.81	0.26 | 0.65	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.72 | 0.79	0.57 | 0.75	0.03 | 0.52	0.77 | 0.79		$\rho = 0$
AIC	0.97 | 0.95	0.97 | 0.95	0.97 | 0.93	0.85 | 0.83		$\bar{s}_{Oracle}$ = 26.2
BIC	0.19 | 0.61	0.07 | 0.57	0.00 | 0.40	0.16 | 0.58		
CV.1se	0.66 | 0.55	0.53 | 0.51	0.12 | 0.42	0.76 | 0.57	0.07 | 0.44	
CV.min	0.85 | 0.72	0.81 | 0.68	0.43 | 0.54	0.86 | 0.67	0.33 | 0.55	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.84 | 0.70	0.79 | 0.66	0.31 | 0.51	0.85 | 0.65		$\rho = 0.5$
AIC	0.96 | 0.96	0.96 | 0.95	0.96 | 0.94	0.87 | 0.67		$\bar{s}_{Oracle}$ = 25.8
BIC	0.41 | 0.44	0.29 | 0.41	0.02 | 0.32	0.51 | 0.43		
CV.1se	0.68 | 0.31	0.80 | 0.34	0.77 | 0.33	0.32 | 0.44	0.61 | 0.35	
CV.min	0.90 | 0.59	0.90 | 0.56	0.84 | 0.45	0.53 | 0.54	0.76 | 0.45	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.91 | 0.56	0.89 | 0.51	0.77 | 0.39	0.53 | 0.54		$\rho = 0.9$
AIC	0.95 | 0.86	0.95 | 0.88	0.94 | 0.88	0.53 | 0.54		$\bar{s}_{Oracle}$ = 23.3
BIC	0.08 | 0.05	0.01 | 0.04	0.01 | 0.05	0.34 | 0.45		
CV.1se	0.12 | 0.38	0.06 | 0.34	0.01 | 0.26	0.63 | 0.64	0.01 | 0.27	
CV.min	0.70 | 0.67	0.55 | 0.60	0.14 | 0.43	0.89 | 0.81	0.37 | 0.54	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.73 | 0.69	0.43 | 0.57	0.01 | 0.22	0.85 | 0.77		$\rho = 0$
AIC	0.98 | 0.95	0.98 | 0.94	0.98 | 0.91	0.94 | 0.88		$\bar{s}_{Oracle}$ = 19.2
BIC	0.13 | 0.41	0.03 | 0.33	0.00 | 0.09	0.17 | 0.44		
CV.1se	0.16 | 0.11	0.19 | 0.15	0.07 | 0.14	0.80 | 0.42	0.10 | 0.22	
CV.min	0.81 | 0.46	0.78 | 0.44	0.35 | 0.30	0.92 | 0.61	0.44 | 0.37	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.84 | 0.50	0.71 | 0.41	0.04 | 0.13	0.90 | 0.57		$\rho = 0.5$
AIC	0.98 | 0.95	0.98 | 0.95	0.98 | 0.93	0.94 | 0.74		$\bar{s}_{Oracle}$ = 19.0
BIC	0.10 | 0.11	0.04 | 0.09	0.00 | 0.05	0.17 | 0.12		
CV.1se	0.00 | 0.07	0.00 | 0.07	0.00 | 0.07	0.45 | 0.28	0.01 | 0.07	
CV.min	0.57 | 0.09	0.45 | 0.08	0.16 | 0.07	0.82 | 0.64	0.35 | 0.12	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.70 | 0.10	0.20 | 0.07	0.00 | 0.07	0.81 | 0.64		$\rho = 0.9$
AIC	0.96 | 0.86	0.97 | 0.90	0.97 | 0.88	0.83 | 0.68		$\bar{s}_{Oracle}$ = 16.4
BIC	0.09 | 0.07	0.01 | 0.07	0.00 | 0.07	0.13 | 0.12		

Table 128: **FDR | Sensitivity for n=1000, continuous design, dense covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.50 | 0.76	0.36 | 0.71	0.07 | 0.56	0.44 | 0.67	0.15 | 0.62	
CV.min	0.65 | 0.84	0.56 | 0.81	0.19 | 0.65	0.58 | 0.74	0.39 | 0.74	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.55 | 0.79	0.47 | 0.77	0.29 | 0.70	0.53 | 0.72		$\rho = 0$
AIC	0.84 | 0.94	0.84 | 0.94	0.84 | 0.91	0.63 | 0.77		$\bar{s}_{Oracle}$ = 122.8
BIC	0.21 | 0.59	0.11 | 0.55	0.01 | 0.43	0.22 | 0.55		
CV.1se	0.68 | 0.74	0.62 | 0.70	0.33 | 0.56	0.65 | 0.58	0.24 | 0.55	
CV.min	0.74 | 0.84	0.70 | 0.80	0.47 | 0.66	0.69 | 0.65	0.42 | 0.64	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.68 | 0.74	0.63 | 0.72	0.48 | 0.68	0.67 | 0.62		$\rho = 0.5$
AIC	0.84 | 0.95	0.84 | 0.94	0.83 | 0.93	0.70 | 0.67		$\bar{s}_{Oracle}$ = 122.5
BIC	0.25 | 0.23	0.35 | 0.39	0.15 | 0.41	0.46 | 0.35		
CV.1se	0.74 | 0.74	0.71 | 0.70	0.60 | 0.58	0.56 | 0.17	0.54 | 0.54	
CV.min	0.77 | 0.83	0.75 | 0.80	0.64 | 0.67	0.61 | 0.21	0.59 | 0.61	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.73 | 0.72	0.71 | 0.70	0.62 | 0.65	0.61 | 0.20		$\rho = 0.9$
AIC	0.77 | 0.83	0.77 | 0.84	0.74 | 0.84	0.61 | 0.21		$\bar{s}_{Oracle}$ = 119.5
BIC	0.05 | 0.01	0.01 | 0.01	0.00 | 0.01	0.47 | 0.14		
CV.1se	0.43 | 0.58	0.27 | 0.50	0.07 | 0.33	0.52 | 0.62	0.26 | 0.49	
CV.min	0.66 | 0.73	0.54 | 0.66	0.19 | 0.45	0.68 | 0.73	0.57 | 0.68	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.60 | 0.69	0.50 | 0.65	0.32 | 0.51	0.62 | 0.69		$\rho = 0$
AIC	0.90 | 0.93	0.90 | 0.92	0.90 | 0.90	0.79 | 0.82		$\bar{s}_{Oracle}$ = 90.2
BIC	0.07 | 0.24	0.03 | 0.23	0.00 | 0.01	0.17 | 0.38		
CV.1se	0.62 | 0.41	0.60 | 0.41	0.33 | 0.28	0.71 | 0.48	0.38 | 0.37	
CV.min	0.76 | 0.66	0.72 | 0.62	0.48 | 0.42	0.77 | 0.60	0.54 | 0.49	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.72 | 0.57	0.69 | 0.57	0.59 | 0.56	0.75 | 0.55		$\rho = 0.5$
AIC	0.90 | 0.95	0.90 | 0.94	0.90 | 0.92	0.82 | 0.75		$\bar{s}_{Oracle}$ = 89.7
BIC	0.01 | 0.01	0.00 | 0.01	0.00 | 0.00	0.09 | 0.04		
CV.1se	0.06 | 0.04	0.18 | 0.10	0.18 | 0.10	0.65 | 0.18	0.61 | 0.30	
CV.min	0.59 | 0.20	0.63 | 0.35	0.43 | 0.24	0.73 | 0.29	0.72 | 0.43	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.67 | 0.16	0.32 | 0.14	0.21 | 0.16	0.73 | 0.28		$\rho = 0.9$
AIC	0.87 | 0.88	0.86 | 0.88	0.86 | 0.85	0.73 | 0.29		$\bar{s}_{Oracle}$ = 86.2
BIC	0.06 | 0.01	0.01 | 0.01	0.00 | 0.01	0.11 | 0.03		
CV.1se	0.09 | 0.06	0.03 | 0.02	0.00 | 0.00	0.65 | 0.45	0.07 | 0.05	
CV.min	0.61 | 0.41	0.36 | 0.23	0.07 | 0.05	0.81 | 0.64	0.59 | 0.40	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.63 | 0.43	0.30 | 0.21	0.00 | 0.00	0.76 | 0.57		$\rho = 0$
AIC	0.94 | 0.92	0.94 | 0.90	0.94 | 0.90	0.90 | 0.81		$\bar{s}_{Oracle}$ = 55.9
BIC	0.01 | 0.01	0.00 | 0.00	0.00 | 0.00	0.06 | 0.04		
CV.1se	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.68 | 0.16	0.16 | 0.01	
CV.min	0.44 | 0.07	0.31 | 0.04	0.10 | 0.01	0.85 | 0.38	0.47 | 0.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.63 | 0.13	0.11 | 0.02	0.00 | 0.00	0.84 | 0.32		$\rho = 0.5$
AIC	0.94 | 0.94	0.94 | 0.93	0.94 | 0.91	0.91 | 0.74		$\bar{s}_{Oracle}$ = 55.6
BIC	0.02 | 0.00	0.00 | 0.00	0.00 | 0.00	0.09 | 0.01		
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.01	0.14 | 0.03	0.00 | 0.01	
CV.min	0.54 | 0.04	0.44 | 0.03	0.10 | 0.02	0.82 | 0.16	0.17 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.66 | 0.05	0.12 | 0.02	0.00 | 0.02	0.82 | 0.18		$\rho = 0.9$
AIC	0.93 | 0.88	0.93 | 0.87	0.94 | 0.83	0.84 | 0.29		$\bar{s}_{Oracle}$ = 52.3
BIC	0.06 | 0.02	0.01 | 0.02	0.00 | 0.01	0.09 | 0.03		

Table 129: **FDR | Sensitivity for n=1000, continuous design, dense covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.47 | 0.74	0.36 | 0.68	0.15 | 0.52	0.41 | 0.64	0.38 | 0.70	
CV.min	0.58 | 0.82	0.50 | 0.77	0.26 | 0.61	0.51 | 0.71	0.54 | 0.80	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.46 | 0.73	0.40 | 0.70	0.35 | 0.67	0.45 | 0.67		$\rho = 0$
AIC	0.75 | 0.93	0.75 | 0.92	0.75 | 0.89	0.57 | 0.76		
BIC	0.06 | 0.21	0.08 | 0.34	0.08 | 0.41	0.19 | 0.42		$\bar{s}_{Oracle}$ = 209.8
CV.1se	0.60 | 0.72	0.55 | 0.67	0.38 | 0.55	0.58 | 0.52	0.37 | 0.55	
CV.min	0.66 | 0.82	0.61 | 0.79	0.46 | 0.65	0.62 | 0.62	0.44 | 0.62	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.58 | 0.66	0.54 | 0.66	0.44 | 0.65	0.59 | 0.56		$\rho = 0.5$
AIC	0.75 | 0.94	0.75 | 0.94	0.74 | 0.92	0.65 | 0.69		
BIC	0.01 | 0.00	0.00 | 0.00	0.07 | 0.12	0.05 | 0.02		$\bar{s}_{Oracle}$ = 209.4
CV.1se	0.65 | 0.72	0.62 | 0.68	0.53 | 0.57	0.57 | 0.13	0.50 | 0.51	
CV.min	0.68 | 0.83	0.66 | 0.80	0.56 | 0.68	0.61 | 0.21	0.53 | 0.59	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.63 | 0.62	0.61 | 0.65	0.54 | 0.65	0.61 | 0.20		$\rho = 0.9$
AIC	0.69 | 0.84	0.68 | 0.84	0.65 | 0.83	0.61 | 0.22		
BIC	0.05 | 0.01	0.01 | 0.01	0.00 | 0.01	0.06 | 0.01		$\bar{s}_{Oracle}$ = 205.7
CV.1se	0.41 | 0.47	0.25 | 0.33	0.06 | 0.11	0.51 | 0.56	0.40 | 0.47	
CV.min	0.61 | 0.67	0.47 | 0.54	0.18 | 0.25	0.62 | 0.67	0.61 | 0.67	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.53 | 0.58	0.48 | 0.55	0.48 | 0.49	0.56 | 0.61		$\rho = 0$
AIC	0.84 | 0.92	0.84 | 0.90	0.85 | 0.89	0.74 | 0.80		
BIC	0.00 | 0.01	0.00 | 0.00	0.00 | 0.00	0.06 | 0.09		$\bar{s}_{Oracle}$ = 143.5
CV.1se	0.17 | 0.06	0.16 | 0.07	0.01 | 0.00	0.65 | 0.34	0.23 | 0.09	
CV.min	0.61 | 0.39	0.51 | 0.31	0.11 | 0.03	0.71 | 0.49	0.55 | 0.33	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.61 | 0.31	0.52 | 0.34	0.53 | 0.45	0.69 | 0.42		$\rho = 0.5$
AIC	0.84 | 0.94	0.84 | 0.93	0.84 | 0.90	0.78 | 0.74		
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.06 | 0.01		$\bar{s}_{Oracle}$ = 143.5
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.38 | 0.05	0.01 | 0.01	
CV.min	0.48 | 0.02	0.40 | 0.02	0.08 | 0.01	0.71 | 0.19	0.21 | 0.04	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58 | 0.03	0.11 | 0.01	0.00 | 0.01	0.71 | 0.20		$\rho = 0.9$
AIC	0.81 | 0.87	0.81 | 0.86	0.81 | 0.83	0.73 | 0.29		
BIC	0.06 | 0.01	0.01 | 0.01	0.00 | 0.01	0.07 | 0.01		$\bar{s}_{Oracle}$ = 139.4
CV.1se	0.04 | 0.01	0.01 | 0.00	0.00 | 0.00	0.67 | 0.34	0.09 | 0.01	
CV.min	0.53 | 0.23	0.20 | 0.05	0.06 | 0.01	0.79 | 0.53	0.54 | 0.23	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.60 | 0.27	0.14 | 0.07	0.00 | 0.00	0.75 | 0.45		$\rho = 0$
AIC	0.92 | 0.91	0.92 | 0.89	0.92 | 0.90	0.88 | 0.77		
BIC	0.01 | 0.00	0.00 | 0.00	0.08 | 0.07	0.05 | 0.01		$\bar{s}_{Oracle}$ = 77.7
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.64 | 0.09	0.25 | 0.00	
CV.min	0.38 | 0.03	0.22 | 0.01	0.08 | 0.00	0.84 | 0.28	0.48 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.06	0.05 | 0.00	0.00 | 0.00	0.83 | 0.23		$\rho = 0.5$
AIC	0.92 | 0.92	0.92 | 0.91	0.92 | 0.90	0.89 | 0.70		
BIC	0.02 | 0.00	0.00 | 0.00	0.00 | 0.00	0.10 | 0.00		$\bar{s}_{Oracle}$ = 77.7
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.07 | 0.01	0.05 | 0.01	
CV.min	0.49 | 0.03	0.40 | 0.02	0.14 | 0.01	0.81 | 0.07	0.32 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.64 | 0.04	0.11 | 0.01	0.01 | 0.01	0.82 | 0.08		$\rho = 0.9$
AIC	0.92 | 0.87	0.92 | 0.84	0.92 | 0.82	0.85 | 0.18		
BIC	0.04 | 0.01	0.01 | 0.01	0.00 | 0.00	0.11 | 0.01		$\bar{s}_{Oracle}$ = 73.5

Table 130: **FDR | Sensitivity for n=1000, continuous design, dense covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.45 | 0.73	0.35 | 0.62	0.22 | 0.38	0.39 | 0.62	0.46 | 0.74	
CV.min	0.53 | 0.82	0.46 | 0.75	0.33 | 0.54	0.46 | 0.70	0.55 | 0.84	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.39 | 0.64	0.36 | 0.63	0.40 | 0.64	0.39 | 0.62		$\rho = 0$
AIC	0.67 | 0.93	0.67 | 0.91	0.67 | 0.88	0.52 | 0.77		$\bar{s}_{Oracle}$ = 293.2
BIC	0.00 | 0.00	0.00 | 0.00	0.28 | 0.43	0.02 | 0.04		
CV.1se	0.51 | 0.58	0.44 | 0.48	0.04 | 0.05	0.51 | 0.40	0.49 | 0.57	
CV.min	0.57 | 0.79	0.53 | 0.71	0.16 | 0.15	0.54 | 0.53	0.58 | 0.80	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.47 | 0.36	0.47 | 0.52	0.46 | 0.63	0.51 | 0.43		$\rho = 0.5$
AIC	0.67 | 0.94	0.66 | 0.93	0.66 | 0.91	0.59 | 0.70		$\bar{s}_{Oracle}$ = 293.1
BIC	0.00 | 0.00	0.00 | 0.00	0.01 | 0.02	0.04 | 0.00		
CV.1se	0.19 | 0.20	0.17 | 0.18	0.00 | 0.00	0.30 | 0.04	0.10 | 0.09	
CV.min	0.53 | 0.50	0.47 | 0.44	0.08 | 0.02	0.57 | 0.16	0.34 | 0.31	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.47 | 0.03	0.16 | 0.08	0.51 | 0.63	0.56 | 0.16		$\rho = 0.9$
AIC	0.62 | 0.86	0.61 | 0.85	0.59 | 0.83	0.57 | 0.30		$\bar{s}_{Oracle}$ = 292.2
BIC	0.05 | 0.00	0.01 | 0.00	0.00 | 0.00	0.06 | 0.01		
CV.1se	0.35 | 0.28	0.12 | 0.07	0.00 | 0.00	0.48 | 0.45	0.36 | 0.29	
CV.min	0.55 | 0.55	0.34 | 0.27	0.04 | 0.02	0.57 | 0.57	0.55 | 0.55	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.46 | 0.41	0.47 | 0.42	0.37 | 0.32	0.51 | 0.48		$\rho = 0$
AIC	0.77 | 0.91	0.77 | 0.88	0.78 | 0.88	0.69 | 0.75		$\bar{s}_{Oracle}$ = 215.4
BIC	0.00 | 0.00	0.00 | 0.00	0.06 | 0.06	0.02 | 0.01		
CV.1se	0.02 | 0.00	0.01 | 0.00	0.00 | 0.00	0.58 | 0.19	0.14 | 0.00	
CV.min	0.39 | 0.08	0.21 | 0.03	0.06 | 0.00	0.65 | 0.36	0.40 | 0.09	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.48 | 0.10	0.12 | 0.04	0.21 | 0.16	0.63 | 0.27		$\rho = 0.5$
AIC	0.77 | 0.92	0.77 | 0.90	0.77 | 0.89	0.72 | 0.70		$\bar{s}_{Oracle}$ = 215.2
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.05 | 0.00		
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.10 | 0.01	0.01 | 0.00	
CV.min	0.44 | 0.02	0.36 | 0.01	0.10 | 0.01	0.66 | 0.07	0.24 | 0.01	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.53 | 0.03	0.10 | 0.01	0.00 | 0.00	0.67 | 0.09		$\rho = 0.9$
AIC	0.75 | 0.85	0.75 | 0.84	0.75 | 0.80	0.69 | 0.33		$\bar{s}_{Oracle}$ = 211.7
BIC	0.04 | 0.00	0.01 | 0.00	0.00 | 0.00	0.09 | 0.01		
CV.1se	0.02 | 0.00	0.00 | 0.00	0.00 | 0.00	0.72 | 0.25	0.16 | 0.00	
CV.min	0.50 | 0.12	0.14 | 0.01	0.07 | 0.00	0.81 | 0.43	0.52 | 0.12	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.60 | 0.15	0.09 | 0.03	0.00 | 0.00	0.77 | 0.35		$\rho = 0$
AIC	0.91 | 0.90	0.91 | 0.89	0.91 | 0.91	0.88 | 0.72		$\bar{s}_{Oracle}$ = 91.3
BIC	0.01 | 0.00	0.00 | 0.00	0.65 | 0.64	0.07 | 0.00		
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.64 | 0.06	0.28 | 0.00	
CV.min	0.38 | 0.02	0.20 | 0.00	0.08 | 0.00	0.84 | 0.22	0.50 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.58 | 0.04	0.03 | 0.00	0.00 | 0.00	0.83 | 0.18		$\rho = 0.5$
AIC	0.91 | 0.91	0.91 | 0.89	0.91 | 0.90	0.89 | 0.66		$\bar{s}_{Oracle}$ = 90.9
BIC	0.02 | 0.00	0.00 | 0.00	0.02 | 0.02	0.11 | 0.00		
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.07 | 0.00	0.19 | 0.00	
CV.min	0.42 | 0.02	0.31 | 0.01	0.13 | 0.01	0.82 | 0.05	0.44 | 0.01	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.59 | 0.03	0.07 | 0.00	0.00 | 0.00	0.83 | 0.06		$\rho = 0.9$
AIC	0.91 | 0.85	0.91 | 0.82	0.91 | 0.82	0.85 | 0.15		$\bar{s}_{Oracle}$ = 87.0
BIC	0.02 | 0.00	0.01 | 0.00	0.00 | 0.00	0.10 | 0.01		

Table 131: **FDR | Sensitivity for n=1000, binary design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.33 | 0.26	0.19 | 0.24	0.01 | 0.20	0.22 | 0.22	0.01 | 0.19	
CV.min	0.67 | 0.33	0.59 | 0.31	0.20 | 0.24	0.51 | 0.26	0.19 | 0.24	$\text{sd}(\mu)/\sigma = 2$
AICc	0.65 | 0.33	0.58 | 0.31	0.34 | 0.27	0.48 | 0.26		$\rho = 0$
AIC	0.88 | 0.72	0.88 | 0.72	0.88 | 0.69	0.49 | 0.26		
BIC	0.20 | 0.24	0.13 | 0.23	0.01 | 0.20	0.16 | 0.21		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.38 | 0.26	0.23 | 0.24	0.02 | 0.20	0.26 | 0.22	0.01 | 0.19	
CV.min	0.69 | 0.34	0.62 | 0.31	0.23 | 0.24	0.53 | 0.26	0.19 | 0.24	$\text{sd}(\mu)/\sigma = 2$
AICc	0.67 | 0.33	0.60 | 0.31	0.37 | 0.27	0.51 | 0.25		$\rho = 0.5$
AIC	0.88 | 0.72	0.88 | 0.72	0.88 | 0.69	0.51 | 0.25		
BIC	0.23 | 0.23	0.14 | 0.23	0.01 | 0.20	0.19 | 0.20		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.41 | 0.26	0.26 | 0.24	0.03 | 0.20	0.28 | 0.21	0.01 | 0.19	
CV.min	0.70 | 0.34	0.63 | 0.31	0.26 | 0.24	0.53 | 0.25	0.21 | 0.24	$\text{sd}(\mu)/\sigma = 2$
AICc	0.68 | 0.33	0.61 | 0.30	0.38 | 0.27	0.51 | 0.25		$\rho = 0.9$
AIC	0.88 | 0.71	0.88 | 0.71	0.88 | 0.69	0.52 | 0.25		
BIC	0.25 | 0.23	0.16 | 0.22	0.02 | 0.20	0.21 | 0.20		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.25 | 0.17	0.12 | 0.15	0.01 | 0.12	0.42 | 0.19	0.01 | 0.12	
CV.min	0.66 | 0.25	0.56 | 0.22	0.14 | 0.16	0.74 | 0.28	0.24 | 0.17	$\text{sd}(\mu)/\sigma = 1$
AICc	0.66 | 0.25	0.59 | 0.23	0.32 | 0.20	0.71 | 0.26		$\rho = 0$
AIC	0.89 | 0.79	0.89 | 0.79	0.89 | 0.76	0.79 | 0.32		
BIC	0.18 | 0.16	0.09 | 0.15	0.00 | 0.12	0.15 | 0.15		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.29 | 0.17	0.15 | 0.15	0.01 | 0.12	0.46 | 0.19	0.01 | 0.12	
CV.min	0.68 | 0.25	0.59 | 0.22	0.14 | 0.16	0.76 | 0.28	0.22 | 0.17	$\text{sd}(\mu)/\sigma = 1$
AICc	0.68 | 0.25	0.60 | 0.23	0.34 | 0.20	0.72 | 0.26		$\rho = 0.5$
AIC	0.89 | 0.79	0.89 | 0.79	0.89 | 0.76	0.79 | 0.32		
BIC	0.20 | 0.15	0.11 | 0.15	0.00 | 0.12	0.17 | 0.15		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.33 | 0.17	0.17 | 0.15	0.02 | 0.12	0.47 | 0.19	0.01 | 0.12	
CV.min	0.69 | 0.25	0.61 | 0.22	0.17 | 0.16	0.75 | 0.28	0.25 | 0.17	$\text{sd}(\mu)/\sigma = 1$
AICc	0.69 | 0.25	0.62 | 0.23	0.36 | 0.20	0.72 | 0.26		$\rho = 0.9$
AIC	0.89 | 0.79	0.89 | 0.78	0.89 | 0.76	0.79 | 0.31		
BIC	0.21 | 0.15	0.12 | 0.14	0.01 | 0.11	0.19 | 0.14		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.11 | 0.07	0.05 | 0.06	0.01 | 0.05	0.56 | 0.14	0.01 | 0.05	
CV.min	0.64 | 0.15	0.50 | 0.13	0.13 | 0.08	0.81 | 0.26	0.35 | 0.11	$\text{sd}(\mu)/\sigma = 0.5$
AICc	0.67 | 0.17	0.55 | 0.14	0.20 | 0.11	0.78 | 0.22		$\rho = 0$
AIC	0.90 | 0.85	0.90 | 0.84	0.90 | 0.83	0.87 | 0.42		
BIC	0.12 | 0.08	0.05 | 0.07	0.00 | 0.03	0.16 | 0.08		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.13 | 0.07	0.07 | 0.06	0.01 | 0.05	0.61 | 0.14	0.01 | 0.05	
CV.min	0.67 | 0.15	0.54 | 0.13	0.14 | 0.08	0.82 | 0.25	0.33 | 0.10	$\text{sd}(\mu)/\sigma = 0.5$
AICc	0.69 | 0.17	0.59 | 0.14	0.23 | 0.11	0.78 | 0.22		$\rho = 0.5$
AIC	0.90 | 0.85	0.90 | 0.84	0.90 | 0.83	0.87 | 0.42		
BIC	0.12 | 0.07	0.06 | 0.06	0.00 | 0.03	0.18 | 0.08		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.15 | 0.07	0.08 | 0.06	0.02 | 0.04	0.60 | 0.14	0.02 | 0.05	
CV.min	0.68 | 0.15	0.56 | 0.13	0.15 | 0.08	0.81 | 0.25	0.34 | 0.10	$\text{sd}(\mu)/\sigma = 0.5$
AICc	0.70 | 0.17	0.60 | 0.14	0.26 | 0.11	0.79 | 0.21		$\rho = 0.9$
AIC	0.90 | 0.85	0.90 | 0.84	0.90 | 0.83	0.86 | 0.41		
BIC	0.13 | 0.07	0.06 | 0.06	0.00 | 0.03	0.19 | 0.08		$\bar{s}_{Oracle}$ = 100.0

Table 132: **FDR | Sensitivity for n=1000, binary design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.50 | 0.86	0.36 | 0.82	0.07 | 0.69	0.44 | 0.77	0.11 | 0.72	
CV.min	0.66 | 0.92	0.57 | 0.89	0.19 | 0.78	0.59 | 0.83	0.36 | 0.84	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.58 | 0.89	0.50 | 0.88	0.40 | 0.85	0.55 | 0.81		$\rho = 0$
AIC	0.87 | 0.97	0.87 | 0.96	0.87 | 0.94	0.64 | 0.85		$\bar{s}_{Oracle}$ = 100.0
BIC	0.24 | 0.72	0.14 | 0.70	0.02 | 0.60	0.23 | 0.66		
CV.1se	0.54 | 0.86	0.40 | 0.82	0.07 | 0.68	0.47 | 0.76	0.10 | 0.71	
CV.min	0.68 | 0.92	0.59 | 0.90	0.20 | 0.78	0.61 | 0.82	0.34 | 0.83	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.59 | 0.88	0.53 | 0.87	0.42 | 0.86	0.57 | 0.81		$\rho = 0.5$
AIC	0.87 | 0.97	0.87 | 0.97	0.87 | 0.95	0.67 | 0.85		$\bar{s}_{Oracle}$ = 100.0
BIC	0.26 | 0.70	0.16 | 0.69	0.03 | 0.60	0.26 | 0.64		
CV.1se	0.55 | 0.86	0.42 | 0.82	0.09 | 0.69	0.48 | 0.75	0.13 | 0.72	
CV.min	0.69 | 0.92	0.60 | 0.90	0.23 | 0.78	0.61 | 0.82	0.36 | 0.83	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.60 | 0.88	0.53 | 0.87	0.42 | 0.85	0.57 | 0.80		$\rho = 0.9$
AIC	0.87 | 0.97	0.87 | 0.97	0.87 | 0.95	0.67 | 0.85		$\bar{s}_{Oracle}$ = 100.0
BIC	0.28 | 0.70	0.18 | 0.68	0.04 | 0.60	0.28 | 0.64		
CV.1se	0.41 | 0.53	0.26 | 0.45	0.07 | 0.31	0.50 | 0.56	0.24 | 0.44	
CV.min	0.64 | 0.67	0.52 | 0.60	0.19 | 0.42	0.66 | 0.67	0.54 | 0.62	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58 | 0.64	0.53 | 0.61	0.60 | 0.63	0.61 | 0.63		$\rho = 0$
AIC	0.89 | 0.92	0.89 | 0.91	0.89 | 0.89	0.78 | 0.77		$\bar{s}_{Oracle}$ = 100.0
BIC	0.08 | 0.24	0.06 | 0.27	0.01 | 0.12	0.17 | 0.35		
CV.1se	0.45 | 0.52	0.30 | 0.45	0.08 | 0.31	0.54 | 0.56	0.21 | 0.41	
CV.min	0.66 | 0.67	0.55 | 0.60	0.20 | 0.42	0.68 | 0.66	0.52 | 0.59	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.60 | 0.63	0.55 | 0.60	0.60 | 0.63	0.63 | 0.63		$\rho = 0.5$
AIC	0.89 | 0.92	0.89 | 0.92	0.89 | 0.89	0.79 | 0.77		$\bar{s}_{Oracle}$ = 100.0
BIC	0.06 | 0.18	0.07 | 0.24	0.01 | 0.12	0.18 | 0.32		
CV.1se	0.47 | 0.52	0.33 | 0.45	0.10 | 0.30	0.54 | 0.55	0.24 | 0.42	
CV.min	0.66 | 0.67	0.56 | 0.60	0.22 | 0.41	0.68 | 0.65	0.53 | 0.59	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.61 | 0.62	0.56 | 0.60	0.59 | 0.62	0.63 | 0.62		$\rho = 0.9$
AIC	0.89 | 0.93	0.89 | 0.91	0.89 | 0.89	0.79 | 0.76		$\bar{s}_{Oracle}$ = 100.0
BIC	0.07 | 0.16	0.08 | 0.23	0.01 | 0.11	0.20 | 0.31		
CV.1se	0.08 | 0.03	0.03 | 0.01	0.00 | 0.00	0.59 | 0.28	0.07 | 0.03	
CV.min	0.56 | 0.26	0.31 | 0.13	0.07 | 0.03	0.75 | 0.44	0.55 | 0.25	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.59 | 0.27	0.58 | 0.28	0.21 | 0.12	0.71 | 0.38		$\rho = 0$
AIC	0.90 | 0.90	0.90 | 0.89	0.90 | 0.89	0.85 | 0.67		$\bar{s}_{Oracle}$ = 100.0
BIC	0.01 | 0.00	0.01 | 0.01	0.00 | 0.00	0.05 | 0.03		
CV.1se	0.07 | 0.02	0.03 | 0.01	0.00 | 0.00	0.62 | 0.27	0.08 | 0.02	
CV.min	0.56 | 0.23	0.33 | 0.12	0.07 | 0.02	0.76 | 0.43	0.54 | 0.22	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.59 | 0.25	0.58 | 0.26	0.27 | 0.15	0.72 | 0.37		$\rho = 0.5$
AIC	0.90 | 0.90	0.90 | 0.89	0.90 | 0.89	0.86 | 0.68		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.05 | 0.02		
CV.1se	0.07 | 0.02	0.03 | 0.01	0.00 | 0.00	0.62 | 0.26	0.08 | 0.01	
CV.min	0.58 | 0.23	0.35 | 0.12	0.09 | 0.02	0.76 | 0.42	0.55 | 0.22	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.61 | 0.25	0.60 | 0.26	0.26 | 0.14	0.72 | 0.36		$\rho = 0.9$
AIC	0.90 | 0.90	0.90 | 0.89	0.90 | 0.89	0.85 | 0.67		$\bar{s}_{Oracle}$ = 100.0
BIC	0.01 | 0.00	0.01 | 0.00	0.00 | 0.00	0.06 | 0.02		

Table 133: **FDR | Sensitivity for n=1000, binary design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.54 | 0.98	0.37 | 0.98	0.08 | 0.93	0.46 | 0.94	0.07 | 0.93	
CV.min	0.68 | 0.99	0.56 | 0.99	0.17 | 0.97	0.58 | 0.96	0.22 | 0.97	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.58 | 0.99	0.48 | 0.99	0.26 | 0.97	0.54 | 0.95		$\rho = 0$
AIC	0.87 | 1.00	0.87 | 0.99	0.87 | 0.98	0.67 | 0.97		$\bar{s}_{Oracle}$ = 100.0
BIC	0.30 | 0.93	0.19 | 0.93	0.03 | 0.87	0.29 | 0.87		
CV.1se	0.57 | 0.98	0.41 | 0.98	0.09 | 0.94	0.49 | 0.93	0.08 | 0.94	
CV.min	0.69 | 0.99	0.59 | 0.99	0.19 | 0.97	0.61 | 0.96	0.21 | 0.97	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.60 | 0.99	0.51 | 0.99	0.28 | 0.98	0.56 | 0.95		$\rho = 0.5$
AIC	0.87 | 1.00	0.87 | 1.00	0.87 | 0.99	0.69 | 0.97		$\bar{s}_{Oracle}$ = 100.0
BIC	0.33 | 0.92	0.22 | 0.93	0.04 | 0.88	0.32 | 0.86		
CV.1se	0.58 | 0.99	0.43 | 0.98	0.11 | 0.94	0.50 | 0.93	0.11 | 0.95	
CV.min	0.70 | 0.99	0.59 | 0.99	0.21 | 0.97	0.61 | 0.95	0.23 | 0.97	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.60 | 0.99	0.52 | 0.99	0.29 | 0.97	0.57 | 0.94		$\rho = 0.9$
AIC	0.87 | 1.00	0.87 | 1.00	0.87 | 0.99	0.69 | 0.97		$\bar{s}_{Oracle}$ = 100.0
BIC	0.34 | 0.92	0.24 | 0.93	0.05 | 0.88	0.34 | 0.85		
CV.1se	0.43 | 0.66	0.28 | 0.55	0.09 | 0.31	0.51 | 0.71	0.38 | 0.65	
CV.min	0.64 | 0.82	0.51 | 0.74	0.22 | 0.49	0.64 | 0.81	0.62 | 0.81	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.57 | 0.77	0.52 | 0.75	0.59 | 0.75	0.59 | 0.77		$\rho = 0$
AIC	0.89 | 0.95	0.89 | 0.93	0.89 | 0.91	0.78 | 0.89		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.02	0.02 | 0.09	0.00 | 0.01	0.10 | 0.27		
CV.1se	0.46 | 0.65	0.31 | 0.55	0.10 | 0.30	0.54 | 0.70	0.40 | 0.63	
CV.min	0.65 | 0.82	0.53 | 0.74	0.23 | 0.49	0.66 | 0.80	0.63 | 0.81	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58 | 0.76	0.54 | 0.75	0.59 | 0.76	0.60 | 0.76		$\rho = 0.5$
AIC	0.89 | 0.95	0.89 | 0.94	0.89 | 0.91	0.79 | 0.89		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.01	0.01 | 0.05	0.00 | 0.01	0.09 | 0.20		
CV.1se	0.48 | 0.65	0.34 | 0.54	0.12 | 0.29	0.55 | 0.69	0.41 | 0.62	
CV.min	0.66 | 0.82	0.55 | 0.74	0.25 | 0.47	0.66 | 0.79	0.64 | 0.80	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.59 | 0.76	0.55 | 0.75	0.60 | 0.75	0.61 | 0.75		$\rho = 0.9$
AIC	0.89 | 0.95	0.89 | 0.94	0.89 | 0.91	0.79 | 0.88		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.01	0.01 | 0.04	0.00 | 0.01	0.09 | 0.17		
CV.1se	0.04 | 0.02	0.01 | 0.00	0.00 | 0.00	0.59 | 0.30	0.08 | 0.01	
CV.min	0.51 | 0.24	0.20 | 0.06	0.05 | 0.01	0.74 | 0.49	0.50 | 0.23	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.55 | 0.26	0.59 | 0.30	0.14 | 0.09	0.69 | 0.41		$\rho = 0$
AIC	0.90 | 0.91	0.90 | 0.89	0.90 | 0.90	0.85 | 0.73		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.04 | 0.01		
CV.1se	0.04 | 0.01	0.00 | 0.00	0.00 | 0.00	0.62 | 0.29	0.08 | 0.01	
CV.min	0.48 | 0.20	0.19 | 0.05	0.04 | 0.01	0.75 | 0.47	0.48 | 0.19	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.55 | 0.23	0.58 | 0.28	0.17 | 0.10	0.71 | 0.40		$\rho = 0.5$
AIC	0.90 | 0.91	0.90 | 0.89	0.90 | 0.90	0.85 | 0.73		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.04 | 0.01		
CV.1se	0.03 | 0.01	0.01 | 0.00	0.00 | 0.00	0.62 | 0.27	0.10 | 0.01	
CV.min	0.51 | 0.19	0.21 | 0.05	0.06 | 0.01	0.75 | 0.46	0.50 | 0.19	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.57 | 0.23	0.59 | 0.28	0.16 | 0.09	0.71 | 0.39		$\rho = 0.9$
AIC	0.90 | 0.91	0.90 | 0.89	0.90 | 0.90	0.85 | 0.72		$\bar{s}_{Oracle}$ = 100.0
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.06 | 0.01		

Table 134: **FDR | Sensitivity for n=1000, binary design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.55 | 1.00	0.35 | 1.00	0.06 | 0.99	0.46 | 0.98	0.04 | 0.98	
CV.min	0.68 | 1.00	0.54 | 1.00	0.13 | 1.00	0.58 | 0.99	0.13 | 0.99	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.58 | 1.00	0.46 | 1.00	0.11 | 0.99	0.53 | 0.98		$\rho = 0$
AIC	0.87 | 1.00	0.87 | 1.00	0.87 | 0.99	0.68 | 0.99		$\bar{s}_{Oracle}$ = 100.0
BIC	0.34 | 0.99	0.20 | 0.99	0.03 | 0.96	0.33 | 0.95		
CV.1se	0.58 | 1.00	0.39 | 1.00	0.06 | 0.99	0.49 | 0.97	0.04 | 0.99	
CV.min	0.70 | 1.00	0.56 | 1.00	0.13 | 1.00	0.60 | 0.98	0.13 | 1.00	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.60 | 1.00	0.48 | 1.00	0.11 | 0.99	0.56 | 0.98		$\rho = 0.5$
AIC	0.87 | 1.00	0.87 | 1.00	0.87 | 0.99	0.70 | 0.99		$\bar{s}_{Oracle}$ = 100.0
BIC	0.37 | 0.98	0.23 | 0.99	0.03 | 0.97	0.36 | 0.94		
CV.1se	0.59 | 1.00	0.41 | 1.00	0.09 | 0.99	0.51 | 0.97	0.07 | 0.99	
CV.min	0.70 | 1.00	0.57 | 1.00	0.16 | 1.00	0.61 | 0.98	0.15 | 1.00	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.61 | 1.00	0.49 | 1.00	0.12 | 0.99	0.57 | 0.98		$\rho = 0.9$
AIC	0.87 | 1.00	0.87 | 1.00	0.87 | 0.99	0.70 | 0.99		$\bar{s}_{Oracle}$ = 100.0
BIC	0.39 | 0.98	0.25 | 0.99	0.04 | 0.97	0.38 | 0.94		
CV.1se	0.43 | 0.72	0.27 | 0.57	0.09 | 0.25	0.51 | 0.77	0.41 | 0.72	
CV.min	0.63 | 0.87	0.49 | 0.79	0.21 | 0.48	0.64 | 0.86	0.63 | 0.87	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.82	0.52 | 0.81	0.60 | 0.80	0.58 | 0.82		$\rho = 0$
AIC	0.89 | 0.96	0.89 | 0.94	0.89 | 0.91	0.78 | 0.93		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.00	0.01 | 0.04	0.00 | 0.01	0.05 | 0.15		
CV.1se	0.46 | 0.70	0.30 | 0.57	0.09 | 0.22	0.54 | 0.76	0.43 | 0.70	
CV.min	0.65 | 0.87	0.52 | 0.79	0.22 | 0.45	0.66 | 0.85	0.65 | 0.87	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58 | 0.81	0.54 | 0.81	0.59 | 0.81	0.60 | 0.81		$\rho = 0.5$
AIC	0.89 | 0.96	0.89 | 0.95	0.89 | 0.92	0.79 | 0.93		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.00	0.00 | 0.02	0.00 | 0.00	0.04 | 0.09		
CV.1se	0.48 | 0.70	0.33 | 0.56	0.09 | 0.20	0.55 | 0.74	0.45 | 0.69	
CV.min	0.66 | 0.87	0.53 | 0.79	0.23 | 0.43	0.66 | 0.84	0.65 | 0.87	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58 | 0.81	0.55 | 0.81	0.60 | 0.80	0.61 | 0.80		$\rho = 0.9$
AIC	0.89 | 0.96	0.89 | 0.94	0.89 | 0.92	0.79 | 0.92		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.00	0.00 | 0.01	0.00 | 0.00	0.04 | 0.07		
CV.1se	0.04 | 0.01	0.00 | 0.00	0.00 | 0.00	0.60 | 0.30	0.09 | 0.01	
CV.min	0.49 | 0.22	0.14 | 0.04	0.04 | 0.01	0.73 | 0.50	0.48 | 0.22	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.54 | 0.25	0.60 | 0.32	0.09 | 0.06	0.69 | 0.42		$\rho = 0$
AIC	0.90 | 0.91	0.90 | 0.89	0.90 | 0.90	0.85 | 0.75		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.04 | 0.01		
CV.1se	0.03 | 0.01	0.00 | 0.00	0.00 | 0.00	0.62 | 0.29	0.10 | 0.01	
CV.min	0.45 | 0.17	0.15 | 0.03	0.04 | 0.01	0.74 | 0.48	0.45 | 0.17	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.53 | 0.21	0.59 | 0.30	0.11 | 0.07	0.70 | 0.40		$\rho = 0.5$
AIC	0.90 | 0.91	0.90 | 0.89	0.90 | 0.91	0.85 | 0.75		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.05 | 0.01		
CV.1se	0.03 | 0.01	0.00 | 0.00	0.00 | 0.00	0.63 | 0.27	0.12 | 0.01	
CV.min	0.47 | 0.17	0.17 | 0.03	0.05 | 0.01	0.75 | 0.47	0.47 | 0.16	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.55 | 0.21	0.60 | 0.29	0.10 | 0.06	0.71 | 0.39		$\rho = 0.9$
AIC	0.90 | 0.91	0.90 | 0.89	0.90 | 0.90	0.85 | 0.74		$\bar{s}_{Oracle}$ = 100.0
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.06 | 0.01		

Table 135: **FDR | Sensitivity for n=1000, continuous design, sparse covariates, and decay 10**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.33 | 0.26	0.20 | 0.24	0.02 | 0.20	0.22 | 0.22	0.00 | 0.19	
CV.min	0.67 | 0.33	0.59 | 0.31	0.20 | 0.24	0.51 | 0.26	0.19 | 0.24	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.65 | 0.33	0.56 | 0.30	0.09 | 0.22	0.48 | 0.26		$\rho = 0$
AIC	0.88 | 0.72	0.88 | 0.72	0.88 | 0.69	0.49 | 0.26		$\bar{s}_{Oracle}$ = 100.0
BIC	0.21 | 0.23	0.11 | 0.22	0.00 | 0.18	0.17 | 0.21		
CV.1se	0.68 | 0.27	0.57 | 0.24	0.16 | 0.18	0.47 | 0.18	0.04 | 0.18	
CV.min	0.79 | 0.36	0.75 | 0.32	0.49 | 0.24	0.56 | 0.20	0.23 | 0.21	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.77 | 0.34	0.72 | 0.30	0.41 | 0.23	0.56 | 0.20		$\rho = 0.5$
AIC	0.88 | 0.66	0.88 | 0.66	0.87 | 0.65	0.56 | 0.20		$\bar{s}_{Oracle}$ = 100.0
BIC	0.46 | 0.20	0.34 | 0.19	0.04 | 0.16	0.46 | 0.18		
CV.1se	0.81 | 0.28	0.79 | 0.25	0.68 | 0.18	0.03 | 0.11	0.45 | 0.16	
CV.min	0.83 | 0.37	0.82 | 0.34	0.75 | 0.24	0.06 | 0.12	0.61 | 0.20	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.82 | 0.33	0.81 | 0.30	0.72 | 0.22	0.06 | 0.12		$\rho = 0.9$
AIC	0.84 | 0.39	0.84 | 0.39	0.81 | 0.35	0.06 | 0.12		$\bar{s}_{Oracle}$ = 100.0
BIC	0.74 | 0.17	0.72 | 0.15	0.45 | 0.10	0.05 | 0.12		
CV.1se	0.25 | 0.17	0.12 | 0.15	0.01 | 0.12	0.43 | 0.19	0.01 | 0.12	
CV.min	0.66 | 0.25	0.56 | 0.22	0.14 | 0.16	0.75 | 0.28	0.23 | 0.17	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.66 | 0.25	0.52 | 0.21	0.03 | 0.13	0.71 | 0.26		$\rho = 0$
AIC	0.89 | 0.79	0.89 | 0.79	0.89 | 0.76	0.79 | 0.32		$\bar{s}_{Oracle}$ = 100.0
BIC	0.18 | 0.16	0.07 | 0.14	0.00 | 0.10	0.15 | 0.15		
CV.1se	0.61 | 0.16	0.49 | 0.14	0.11 | 0.11	0.70 | 0.18	0.06 | 0.11	
CV.min	0.79 | 0.26	0.75 | 0.23	0.40 | 0.15	0.80 | 0.25	0.30 | 0.14	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.78 | 0.25	0.73 | 0.21	0.28 | 0.14	0.79 | 0.24		$\rho = 0.5$
AIC	0.89 | 0.75	0.89 | 0.75	0.89 | 0.72	0.80 | 0.26		$\bar{s}_{Oracle}$ = 100.0
BIC	0.38 | 0.12	0.27 | 0.11	0.02 | 0.08	0.47 | 0.12		
CV.1se	0.63 | 0.11	0.74 | 0.12	0.71 | 0.10	0.30 | 0.10	0.57 | 0.09	
CV.min	0.83 | 0.24	0.83 | 0.22	0.77 | 0.14	0.49 | 0.13	0.70 | 0.13	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.84 | 0.23	0.82 | 0.19	0.71 | 0.12	0.49 | 0.13		$\rho = 0.9$
AIC	0.87 | 0.48	0.87 | 0.49	0.87 | 0.47	0.49 | 0.13		$\bar{s}_{Oracle}$ = 100.0
BIC	0.08 | 0.01	0.01 | 0.01	0.01 | 0.01	0.32 | 0.10		
CV.1se	0.11 | 0.07	0.05 | 0.06	0.01 | 0.05	0.57 | 0.15	0.01 | 0.05	
CV.min	0.64 | 0.16	0.50 | 0.13	0.12 | 0.08	0.81 | 0.26	0.34 | 0.11	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.67 | 0.17	0.40 | 0.12	0.00 | 0.04	0.78 | 0.22		$\rho = 0$
AIC	0.90 | 0.85	0.90 | 0.84	0.90 | 0.83	0.87 | 0.41		$\bar{s}_{Oracle}$ = 100.0
BIC	0.12 | 0.08	0.03 | 0.06	0.00 | 0.02	0.15 | 0.08		
CV.1se	0.14 | 0.02	0.17 | 0.03	0.06 | 0.03	0.73 | 0.11	0.09 | 0.04	
CV.min	0.74 | 0.12	0.71 | 0.11	0.33 | 0.06	0.84 | 0.22	0.41 | 0.07	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.77 | 0.14	0.65 | 0.10	0.04 | 0.02	0.83 | 0.19		$\rho = 0.5$
AIC	0.90 | 0.83	0.90 | 0.82	0.90 | 0.80	0.87 | 0.33		$\bar{s}_{Oracle}$ = 100.0
BIC	0.09 | 0.02	0.04 | 0.02	0.00 | 0.01	0.16 | 0.02		
CV.1se	0.00 | 0.01	0.00 | 0.01	0.00 | 0.01	0.41 | 0.05	0.01 | 0.01	
CV.min	0.52 | 0.02	0.41 | 0.01	0.14 | 0.01	0.75 | 0.14	0.32 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.64 | 0.03	0.18 | 0.01	0.00 | 0.01	0.74 | 0.14		$\rho = 0.9$
AIC	0.88 | 0.58	0.89 | 0.60	0.89 | 0.57	0.76 | 0.15		$\bar{s}_{Oracle}$ = 100.0
BIC	0.08 | 0.01	0.01 | 0.01	0.00 | 0.01	0.12 | 0.02		

Table 136: **FDR | Sensitivity for n=1000, continuous design, sparse covariates, and decay 50**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.51 | 0.86	0.36 | 0.82	0.07 | 0.69	0.44 | 0.77	0.11 | 0.72	
CV.min	0.67 | 0.91	0.57 | 0.89	0.19 | 0.78	0.59 | 0.83	0.36 | 0.84	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.58 | 0.89	0.49 | 0.87	0.23 | 0.78	0.55 | 0.81		$\rho = 0$
AIC	0.87 | 0.97	0.87 | 0.96	0.87 | 0.94	0.64 | 0.85		
BIC	0.24 | 0.72	0.12 | 0.68	0.01 | 0.54	0.24 | 0.66		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.70 | 0.84	0.63 | 0.80	0.33 | 0.68	0.67 | 0.67	0.24 | 0.67	
CV.min	0.77 | 0.91	0.72 | 0.89	0.48 | 0.78	0.71 | 0.73	0.42 | 0.76	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.70 | 0.84	0.66 | 0.83	0.47 | 0.79	0.69 | 0.71		$\rho = 0.5$
AIC	0.86 | 0.97	0.86 | 0.97	0.86 | 0.96	0.72 | 0.74		
BIC	0.32 | 0.35	0.38 | 0.50	0.16 | 0.51	0.49 | 0.44		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.76 | 0.82	0.73 | 0.78	0.61 | 0.67	0.57 | 0.20	0.54 | 0.63	
CV.min	0.79 | 0.89	0.77 | 0.88	0.66 | 0.77	0.61 | 0.24	0.60 | 0.70	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.75 | 0.80	0.73 | 0.79	0.64 | 0.74	0.61 | 0.24		$\rho = 0.9$
AIC	0.79 | 0.89	0.78 | 0.90	0.76 | 0.91	0.61 | 0.24		
BIC	0.06 | 0.01	0.01 | 0.01	0.02 | 0.03	0.48 | 0.17		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.41 | 0.53	0.26 | 0.45	0.07 | 0.30	0.50 | 0.56	0.24 | 0.44	
CV.min	0.64 | 0.67	0.52 | 0.60	0.18 | 0.41	0.66 | 0.67	0.54 | 0.62	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.58 | 0.63	0.49 | 0.59	0.28 | 0.46	0.60 | 0.63		$\rho = 0$
AIC	0.89 | 0.92	0.89 | 0.91	0.89 | 0.89	0.78 | 0.77		
BIC	0.08 | 0.23	0.04 | 0.22	0.00 | 0.02	0.17 | 0.34		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.63 | 0.39	0.59 | 0.39	0.33 | 0.26	0.70 | 0.44	0.36 | 0.34	
CV.min	0.75 | 0.61	0.71 | 0.57	0.47 | 0.39	0.76 | 0.55	0.53 | 0.45	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.71 | 0.53	0.68 | 0.52	0.57 | 0.51	0.74 | 0.51		$\rho = 0.5$
AIC	0.89 | 0.93	0.89 | 0.93	0.89 | 0.90	0.81 | 0.70		
BIC	0.01 | 0.01	0.00 | 0.01	0.00 | 0.00	0.09 | 0.04		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.07 | 0.04	0.22 | 0.12	0.22 | 0.11	0.64 | 0.16	0.63 | 0.28	
CV.min	0.61 | 0.23	0.64 | 0.35	0.48 | 0.26	0.72 | 0.25	0.71 | 0.40	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.67 | 0.17	0.35 | 0.15	0.26 | 0.18	0.72 | 0.25		$\rho = 0.9$
AIC	0.85 | 0.83	0.85 | 0.83	0.84 | 0.80	0.72 | 0.26		
BIC	0.06 | 0.01	0.01 | 0.01	0.00 | 0.01	0.12 | 0.02		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.08 | 0.03	0.03 | 0.01	0.00 | 0.00	0.60 | 0.29	0.07 | 0.03	
CV.min	0.56 | 0.26	0.33 | 0.14	0.07 | 0.03	0.75 | 0.44	0.55 | 0.25	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.59 | 0.27	0.28 | 0.13	0.00 | 0.00	0.71 | 0.38		$\rho = 0$
AIC	0.90 | 0.90	0.90 | 0.89	0.90 | 0.89	0.85 | 0.67		
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.05 | 0.02		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.65 | 0.11	0.16 | 0.00	
CV.min	0.42 | 0.04	0.30 | 0.03	0.10 | 0.01	0.81 | 0.28	0.45 | 0.04	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.59 | 0.08	0.10 | 0.01	0.00 | 0.00	0.79 | 0.23		$\rho = 0.5$
AIC	0.90 | 0.91	0.90 | 0.90	0.90 | 0.89	0.87 | 0.63		
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.08 | 0.01		$\bar{s}_{Oracle}$ = 100.0
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.13 | 0.01	0.00 | 0.00	
CV.min	0.52 | 0.02	0.40 | 0.02	0.10 | 0.01	0.77 | 0.11	0.16 | 0.01	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.62 | 0.03	0.11 | 0.01	0.00 | 0.01	0.79 | 0.12		$\rho = 0.9$
AIC	0.89 | 0.80	0.88 | 0.78	0.89 | 0.75	0.80 | 0.20		
BIC	0.05 | 0.01	0.01 | 0.01	0.00 | 0.01	0.09 | 0.01		$\bar{s}_{Oracle}$ = 100.0

Table 137: **FDR | Sensitivity for n=1000, continuous design, sparse covariates, and decay 100**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.54 | 0.98	0.38 | 0.98	0.08 | 0.93	0.46 | 0.94	0.07 | 0.93	
CV.min	0.68 | 0.99	0.56 | 0.99	0.17 | 0.97	0.58 | 0.96	0.23 | 0.97	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.58 | 0.99	0.47 | 0.99	0.10 | 0.94	0.54 | 0.95		$\rho = 0$
AIC	0.87 | 1.00	0.87 | 0.99	0.87 | 0.98	0.67 | 0.97		$\bar{s}_{Oracle}$ = 100.0
BIC	0.31 | 0.93	0.17 | 0.93	0.03 | 0.85	0.29 | 0.88		
CV.1se	0.72 | 0.98	0.65 | 0.98	0.36 | 0.96	0.68 | 0.84	0.28 | 0.96	
CV.min	0.78 | 1.00	0.72 | 0.99	0.48 | 0.99	0.72 | 0.90	0.41 | 0.98	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.70 | 0.98	0.65 | 0.98	0.38 | 0.97	0.70 | 0.87		$\rho = 0.5$
AIC	0.87 | 1.00	0.87 | 1.00	0.86 | 1.00	0.74 | 0.91		$\bar{s}_{Oracle}$ = 100.0
BIC	0.01 | 0.01	0.02 | 0.04	0.26 | 0.89	0.10 | 0.09		
CV.1se	0.76 | 0.98	0.72 | 0.97	0.58 | 0.95	0.63 | 0.25	0.52 | 0.94	
CV.min	0.80 | 0.99	0.77 | 0.99	0.63 | 0.98	0.67 | 0.35	0.57 | 0.97	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.74 | 0.96	0.71 | 0.97	0.57 | 0.96	0.66 | 0.34		$\rho = 0.9$
AIC	0.80 | 0.99	0.79 | 1.00	0.77 | 1.00	0.66 | 0.35		$\bar{s}_{Oracle}$ = 100.0
BIC	0.09 | 0.02	0.03 | 0.01	0.01 | 0.02	0.14 | 0.03		
CV.1se	0.43 | 0.66	0.28 | 0.55	0.09 | 0.31	0.51 | 0.71	0.38 | 0.64	
CV.min	0.64 | 0.82	0.51 | 0.74	0.22 | 0.49	0.65 | 0.81	0.62 | 0.81	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.77	0.48 | 0.72	0.42 | 0.64	0.59 | 0.77		$\rho = 0$
AIC	0.89 | 0.95	0.89 | 0.93	0.89 | 0.90	0.78 | 0.89		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.02	0.00 | 0.03	0.00 | 0.00	0.10 | 0.27		
CV.1se	0.41 | 0.27	0.42 | 0.30	0.06 | 0.05	0.69 | 0.49	0.43 | 0.35	
CV.min	0.71 | 0.67	0.67 | 0.64	0.25 | 0.20	0.74 | 0.64	0.60 | 0.58	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.68 | 0.54	0.65 | 0.60	0.60 | 0.66	0.72 | 0.57		$\rho = 0.5$
AIC	0.89 | 0.96	0.88 | 0.96	0.89 | 0.93	0.82 | 0.83		$\bar{s}_{Oracle}$ = 100.0
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.05 | 0.01		
CV.1se	0.01 | 0.01	0.02 | 0.01	0.00 | 0.01	0.52 | 0.11	0.11 | 0.07	
CV.min	0.55 | 0.05	0.48 | 0.09	0.14 | 0.02	0.73 | 0.26	0.41 | 0.21	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.63 | 0.05	0.17 | 0.03	0.04 | 0.04	0.73 | 0.28		$\rho = 0.9$
AIC	0.85 | 0.93	0.85 | 0.93	0.84 | 0.90	0.74 | 0.36		$\bar{s}_{Oracle}$ = 100.0
BIC	0.07 | 0.01	0.02 | 0.01	0.00 | 0.01	0.08 | 0.01		
CV.1se	0.05 | 0.01	0.01 | 0.00	0.00 | 0.00	0.60 | 0.30	0.07 | 0.01	
CV.min	0.51 | 0.24	0.20 | 0.07	0.04 | 0.01	0.74 | 0.49	0.51 | 0.24	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.56 | 0.26	0.18 | 0.09	0.00 | 0.00	0.69 | 0.41		$\rho = 0$
AIC	0.90 | 0.91	0.90 | 0.89	0.90 | 0.90	0.85 | 0.73		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.00	0.00 | 0.00	0.02 | 0.02	0.04 | 0.01		
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.62 | 0.09	0.22 | 0.00	
CV.min	0.36 | 0.03	0.21 | 0.01	0.07 | 0.00	0.81 | 0.27	0.45 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.54 | 0.06	0.05 | 0.00	0.00 | 0.00	0.79 | 0.21		$\rho = 0.5$
AIC	0.90 | 0.92	0.90 | 0.90	0.90 | 0.90	0.87 | 0.68		$\bar{s}_{Oracle}$ = 100.0
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.07 | 0.00		
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.08 | 0.01	0.04 | 0.00	
CV.min	0.51 | 0.02	0.41 | 0.02	0.13 | 0.01	0.78 | 0.07	0.31 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.63 | 0.03	0.11 | 0.01	0.01 | 0.01	0.79 | 0.08		$\rho = 0.9$
AIC	0.89 | 0.84	0.89 | 0.82	0.89 | 0.80	0.81 | 0.17		$\bar{s}_{Oracle}$ = 100.0
BIC	0.04 | 0.01	0.01 | 0.01	0.00 | 0.00	0.10 | 0.01		

Table 138: **FDR | Sensitivity for n=1000, continuous design, sparse covariates, and decay 200**.

	lasso	GL $\gamma = 1$	GL $\gamma = 10$	marginal AL	sparsenet MCP	
CV.1se	0.55 | 1.00	0.35 | 1.00	0.06 | 0.99	0.46 | 0.98	0.04 | 0.98	
CV.min	0.68 | 1.00	0.54 | 1.00	0.13 | 1.00	0.58 | 0.99	0.14 | 0.99	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.58 | 1.00	0.44 | 1.00	0.03 | 0.98	0.53 | 0.98		$\rho = 0$
AIC	0.87 | 1.00	0.87 | 1.00	0.87 | 0.99	0.68 | 0.99		$\bar{s}_{Oracle}$ = 100.0
BIC	0.34 | 0.98	0.18 | 0.98	0.02 | 0.96	0.33 | 0.95		
CV.1se	0.73 | 1.00	0.64 | 1.00	0.31 | 1.00	0.68 | 0.90	0.11 | 1.00	
CV.min	0.78 | 1.00	0.71 | 1.00	0.38 | 1.00	0.73 | 0.94	0.19 | 1.00	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.71 | 1.00	0.63 | 1.00	0.22 | 1.00	0.70 | 0.92		$\rho = 0.5$
AIC	0.87 | 1.00	0.87 | 1.00	0.87 | 1.00	0.76 | 0.95		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.01	0.04 | 0.08	0.20 | 0.99	0.05 | 0.03		
CV.1se	0.77 | 1.00	0.72 | 1.00	0.56 | 1.00	0.63 | 0.30	0.46 | 1.00	
CV.min	0.81 | 1.00	0.77 | 1.00	0.60 | 1.00	0.67 | 0.47	0.52 | 1.00	$\mathrm{sd}(\mu)/\sigma = 2$
AICc	0.74 | 0.99	0.70 | 1.00	0.51 | 0.99	0.67 | 0.46		$\rho = 0.9$
AIC	0.81 | 1.00	0.80 | 1.00	0.79 | 1.00	0.67 | 0.48		$\bar{s}_{Oracle}$ = 100.0
BIC	0.14 | 0.02	0.06 | 0.02	0.14 | 0.28	0.13 | 0.02		
CV.1se	0.44 | 0.72	0.27 | 0.57	0.09 | 0.25	0.51 | 0.77	0.42 | 0.72	
CV.min	0.64 | 0.87	0.49 | 0.79	0.22 | 0.48	0.64 | 0.86	0.64 | 0.87	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.56 | 0.83	0.48 | 0.78	0.43 | 0.67	0.58 | 0.82		$\rho = 0$
AIC	0.89 | 0.96	0.89 | 0.94	0.89 | 0.91	0.78 | 0.93		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.01	0.00 | 0.00	0.00 | 0.00	0.05 | 0.14		
CV.1se	0.24 | 0.14	0.22 | 0.15	0.01 | 0.01	0.68 | 0.49	0.28 | 0.18	
CV.min	0.65 | 0.60	0.56 | 0.53	0.10 | 0.04	0.74 | 0.66	0.61 | 0.57	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.63 | 0.46	0.61 | 0.62	0.60 | 0.73	0.71 | 0.59		$\rho = 0.5$
AIC	0.88 | 0.97	0.88 | 0.97	0.89 | 0.94	0.82 | 0.88		$\bar{s}_{Oracle}$ = 100.0
BIC	0.01 | 0.00	0.00 | 0.00	0.00 | 0.00	0.05 | 0.01		
CV.1se	0.01 | 0.01	0.01 | 0.01	0.01 | 0.01	0.32 | 0.06	0.02 | 0.01	
CV.min	0.57 | 0.05	0.50 | 0.04	0.16 | 0.02	0.73 | 0.24	0.29 | 0.05	$\mathrm{sd}(\mu)/\sigma = 1$
AICc	0.64 | 0.05	0.20 | 0.02	0.04 | 0.04	0.73 | 0.26		$\rho = 0.9$
AIC	0.85 | 0.96	0.85 | 0.96	0.85 | 0.94	0.75 | 0.47		$\bar{s}_{Oracle}$ = 100.0
BIC	0.11 | 0.02	0.04 | 0.01	0.01 | 0.01	0.14 | 0.02		
CV.1se	0.04 | 0.01	0.01 | 0.00	0.00 | 0.00	0.60 | 0.31	0.07 | 0.01	
CV.min	0.48 | 0.22	0.15 | 0.04	0.04 | 0.01	0.73 | 0.50	0.49 | 0.22	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.54 | 0.25	0.13 | 0.07	0.00 | 0.00	0.69 | 0.42		$\rho = 0$
AIC	0.90 | 0.91	0.90 | 0.89	0.90 | 0.90	0.85 | 0.75		$\bar{s}_{Oracle}$ = 100.0
BIC	0.00 | 0.00	0.00 | 0.00	0.18 | 0.17	0.04 | 0.01		
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.60 | 0.08	0.24 | 0.00	
CV.min	0.34 | 0.03	0.18 | 0.01	0.07 | 0.00	0.81 | 0.26	0.45 | 0.03	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.53 | 0.06	0.03 | 0.00	0.00 | 0.00	0.79 | 0.21		$\rho = 0.5$
AIC	0.90 | 0.92	0.90 | 0.90	0.90 | 0.90	0.86 | 0.69		$\bar{s}_{Oracle}$ = 100.0
BIC	0.02 | 0.00	0.00 | 0.00	0.00 | 0.00	0.07 | 0.00		
CV.1se	0.00 | 0.00	0.00 | 0.00	0.00 | 0.00	0.09 | 0.01	0.08 | 0.00	
CV.min	0.49 | 0.02	0.38 | 0.01	0.14 | 0.01	0.79 | 0.06	0.39 | 0.02	$\mathrm{sd}(\mu)/\sigma = 0.5$
AICc	0.62 | 0.03	0.11 | 0.01	0.01 | 0.00	0.79 | 0.07		$\rho = 0.9$
AIC	0.89 | 0.86	0.89 | 0.83	0.89 | 0.82	0.81 | 0.17		$\bar{s}_{Oracle}$ = 100.0
BIC	0.04 | 0.01	0.01 | 0.00	0.00 | 0.00	0.11 | 0.01		