Supplement to the paper 'Classification Methods Based on Fitting Logistic Regression to Positive and Unlabeled Data with Some Extensions to Feature Selection and Regularization'

Konrad Furmańczyk, Kacper Paczutkowski, Marcin Dudziński, and Diana-Dziewa Dawidczyk

Institute of Information Technology, Warsaw University of Life Sciences, Warsaw, Poland

1 Explanation to the content of inserted tables

In all of the tables concerning the accuracy, the recall, the precision and the F1-score, the standard deviations are given in parentheses.

2 Calibration of parameters for the LassoJoint method

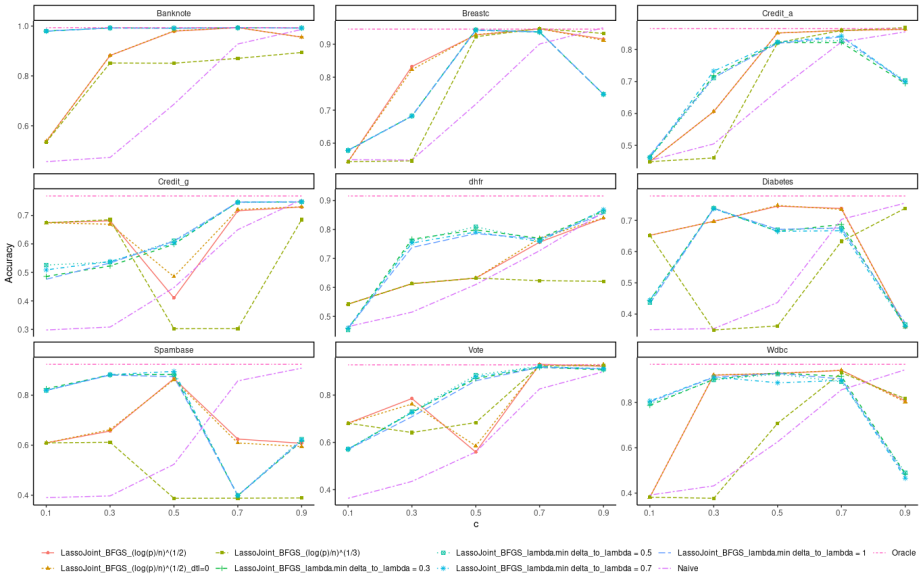

Fig. 1. The accuracy for the low-dimensional datasets

Table 1. Accuracy score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.54(0.05)	0.88(0.02)	0.98(0.04)	0.99(0)	0.96(0.08)
LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.54(0.05)	0.88(0.02)	0.98(0.04)	0.99(0)	0.96(0.08)
LassoJoint_BFGS_(log(p)/n)^(1/3)	0.53(0.04)	0.85(0.02)	0.85(0.02)	0.87(0.02)	0.89(0.02)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.3	0.98(0.04)	0.99(0)	0.99(0.01)	0.99(0)	0.99(0.01)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.5	0.98(0.04)	0.99(0)	0.99(0.01)	0.99(0)	0.99(0.01)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.7	0.98(0.04)	0.99(0)	0.99(0.01)	0.99(0)	0.99(0.01)
LassoJoint_BFGS_lambda.min delta_to_lambda = 1	0.98(0.04)	0.99(0)	0.99(0.01)	0.99(0)	0.99(0.01)
Naive	0.46(0.02)	0.47(0.02)	0.69(0.03)	0.93(0.01)	0.99(0.01)
Oracle	0.99(0)	0.99(0)	0.99(0)	0.99(0)	0.99(0)

Table 2. Accuracy score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.54(0.05)	0.83(0.17)	0.93(0.03)	0.95(0.02)	0.92(0.11)
LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.54(0.05)	0.82(0.18)	0.93(0.03)	0.95(0.02)	0.91(0.11)
LassoJoint_BFGS_(log(p)/n)^(1/3)	0.54(0.05)	0.55(0.05)	0.92(0.05)	0.95(0.02)	0.93(0.02)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.3	0.58(0.08)	0.68(0.17)	0.94(0.03)	0.94(0.02)	0.75(0.2)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.5	0.58(0.08)	0.68(0.17)	0.94(0.02)	0.94(0.02)	0.75(0.2)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.7	0.58(0.08)	0.68(0.17)	0.94(0.03)	0.94(0.02)	0.75(0.2)
LassoJoint_BFGS_lambda.min delta_to_lambda = 1	0.58(0.08)	0.68(0.17)	0.94(0.02)	0.94(0.03)	0.75(0.2)
Naive	0.55(0.04)	0.55(0.04)	0.72(0.06)	0.9(0.03)	0.95(0.02)
Oracle	0.95(0.02)	0.95(0.02)	0.95(0.02)	0.95(0.02)	0.95(0.02)

Table 3. Accuracy score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.45(0.04)	0.61(0.2)	0.85(0.07)	0.86(0.03)	0.86(0.03)
LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.45(0.04)	0.61(0.2)	0.85(0.07)	0.86(0.03)	0.86(0.03)
LassoJoint_BFGS_(log(p)/n)^(1/3)	0.45(0.04)	0.46(0.04)	0.82(0.13)	0.86(0.03)	0.87(0.03)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.3	0.46(0.04)	0.72(0.12)	0.82(0.09)	0.82(0.06)	0.69(0.11)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.5	0.46(0.04)	0.71(0.11)	0.82(0.09)	0.83(0.07)	0.7(0.12)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.7	0.46(0.04)	0.73(0.11)	0.82(0.09)	0.84(0.04)	0.7(0.11)
LassoJoint_BFGS_lambda.min delta_to_lambda = 1	0.47(0.07)	0.71(0.11)	0.82(0.09)	0.84(0.05)	0.7(0.11)
Naive	0.45(0.03)	0.5(0.04)	0.67(0.04)	0.82(0.03)	0.86(0.03)
Oracle	0.87(0.03)	0.87(0.03)	0.87(0.02)	0.87(0.03)	0.87(0.02)

Table 4. Accuracy score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.67(0.1)	0.68(0.09)	0.41(0.17)	0.72(0.06)	0.73(0.04)
LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.67(0.1)	0.67(0.1)	0.48(0.19)	0.72(0.03)	0.73(0.04)
LassoJoint_BFGS_(log(p)/n)^(1/3)	0.67(0.1)	0.68(0.08)	0.3(0.03)	0.3(0.06)	0.69(0.07)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.3	0.49(0.19)	0.52(0.15)	0.6(0.14)	0.75(0.03)	0.75(0.04)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.5	0.53(0.19)	0.54(0.14)	0.61(0.13)	0.75(0.03)	0.75(0.04)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.7	0.51(0.19)	0.54(0.14)	0.6(0.15)	0.75(0.03)	0.75(0.04)
LassoJoint_BFGS_lambda.min delta_to_lambda = 1	0.48(0.19)	0.53(0.13)	0.61(0.13)	0.75(0.03)	0.75(0.04)
Naive	0.3(0.02)	0.31(0.03)	0.45(0.03)	0.65(0.03)	0.76(0.03)
Oracle	0.77(0.02)	0.77(0.02)	0.77(0.03)	0.77(0.03)	0.77(0.02)

Table 5. Accuracy score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.54(0.13)	0.61(0.1)	0.63(0.07)	0.76(0.08)	0.84(0.04)
LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.54(0.13)	0.61(0.1)	0.63(0.07)	0.77(0.07)	0.84(0.04)
LassoJoint_BFGS_(log(p)/n)^(1/3)	0.54(0.13)	0.61(0.1)	0.63(0.07)	0.62(0.05)	0.62(0.05)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.3	0.46(0.13)	0.77(0.18)	0.8(0.12)	0.77(0.1)	0.86(0.07)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.5	0.45(0.14)	0.76(0.18)	0.81(0.1)	0.76(0.1)	0.86(0.07)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.7	0.46(0.13)	0.75(0.19)	0.79(0.12)	0.76(0.1)	0.87(0.05)
LassoJoint_BFGS_lambda.min delta_to_lambda = 1	0.46(0.13)	0.74(0.2)	0.79(0.13)	0.77(0.09)	0.85(0.08)
Naive	0.46(0.06)	0.51(0.06)	0.61(0.05)	0.73(0.05)	0.86(0.04)
Oracle	0.92(0.03)	0.92(0.03)	0.92(0.03)	0.92(0.03)	0.92(0.03)

Table 6. Accuracy score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.65(0.03)	0.7(0.08)	0.75(0.03)	0.74(0.09)	0.36(0.05)
LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.65(0.03)	0.7(0.08)	0.75(0.03)	0.74(0.1)	0.36(0.05)
LassoJoint_BFGS_(log(p)/n)^(1/3)	0.65(0.03)	0.35(0.03)	0.36(0.07)	0.63(0.18)	0.74(0.07)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.3	0.44(0.13)	0.74(0.03)	0.67(0.13)	0.69(0.15)	0.36(0.05)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.5	0.44(0.13)	0.74(0.03)	0.67(0.13)	0.68(0.15)	0.37(0.07)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.7	0.44(0.13)	0.74(0.03)	0.67(0.12)	0.67(0.16)	0.36(0.05)
LassoJoint_BFGS_lambda.min delta_to_lambda = 1	0.43(0.12)	0.74(0.03)	0.67(0.12)	0.68(0.15)	0.37(0.08)
Naive	0.35(0.03)	0.35(0.03)	0.44(0.04)	0.7(0.04)	0.76(0.03)
Oracle	0.78(0.02)	0.78(0.02)	0.78(0.02)	0.78(0.03)	0.78(0.03)

Table 7. Accuracy score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.61(0.01)	0.66(0.21)	0.87(0.11)	0.62(0.26)	0.61(0.22)
LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.61(0.01)	0.66(0.21)	0.86(0.12)	0.61(0.25)	0.59(0.21)
LassoJoint_BFGS_(log(p)/n)^(1/3)	0.61(0.01)	0.61(0.01)	0.39(0.01)	0.39(0.01)	0.39(0.01)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.3	0.83(0.02)	0.88(0.01)	0.88(0.12)	0.4(0.01)	0.62(0.26)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.5	0.82(0.04)	0.88(0.02)	0.88(0.12)	0.4(0.01)	0.62(0.26)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.7	0.82(0.04)	0.88(0.02)	0.9(0.1)	0.4(0.01)	0.62(0.27)
LassoJoint_BFGS_lambda.min delta_to_lambda = 1	0.82(0.05)	0.88(0.02)	0.87(0.14)	0.4(0.01)	0.62(0.26)
Naive	0.39(0.01)	0.4(0.01)	0.52(0.02)	0.86(0.01)	0.91(0.01)
Oracle	0.92(0.01)	0.92(0.01)	0.92(0.01)	0.92(0.01)	0.92(0.01)

Table 8. Accuracy score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.68(0.06)	0.79(0.24)	0.56(0.31)	0.93(0.07)	0.92(0.07)
LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.68(0.06)	0.76(0.25)	0.59(0.31)	0.93(0.08)	0.93(0.03)
LassoJoint_BFGS_(log(p)/n)^(1/3)	0.68(0.06)	0.64(0.14)	0.68(0.07)	0.92(0.1)	0.93(0.03)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.3	0.57(0.11)	0.73(0.24)	0.87(0.09)	0.92(0.03)	0.91(0.06)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.5	0.57(0.11)	0.73(0.24)	0.88(0.06)	0.92(0.03)	0.91(0.06)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.7	0.57(0.12)	0.73(0.25)	0.88(0.09)	0.92(0.03)	0.91(0.04)
LassoJoint_BFGS_lambda.min delta_to_lambda = 1	0.57(0.11)	0.71(0.25)	0.86(0.12)	0.92(0.03)	0.91(0.03)
Naive	0.36(0.05)	0.44(0.06)	0.56(0.06)	0.83(0.04)	0.9(0.03)
Oracle	0.93(0.03)	0.93(0.03)	0.93(0.03)	0.93(0.03)	0.93(0.02)

Table 9. Accuracy score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.38(0.04)	0.92(0.02)	0.93(0.03)	0.94(0.02)	0.81(0.22)
LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.38(0.04)	0.92(0.02)	0.93(0.03)	0.94(0.02)	0.8(0.23)
LassoJoint_BFGS_(log(p)/n)^(1/3)	0.38(0.04)	0.38(0.04)	0.71(0.26)	0.93(0.02)	0.82(0.21)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.3	0.79(0.18)	0.9(0.12)	0.93(0.08)	0.91(0.12)	0.48(0.15)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.5	0.79(0.16)	0.9(0.12)	0.93(0.08)	0.89(0.15)	0.49(0.13)
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.7	0.81(0.15)	0.91(0.08)	0.89(0.17)	0.9(0.15)	0.47(0.12)
LassoJoint_BFGS_lambda.min delta_to_lambda = 1	0.8(0.17)	0.91(0.08)	0.93(0.09)	0.9(0.14)	0.48(0.14)
Naive	0.39(0.03)	0.43(0.03)	0.63(0.05)	0.86(0.04)	0.94(0.02)
Oracle	0.97(0.01)	0.97(0.01)	0.97(0.01)	0.97(0.01)	0.97(0.01)

Table 10. Method avg.rank based on Accuracy metrics

method	0.1	0.3	0.5	0.7	0.9
Oracle	1.00	1.44	1.44	2.22	2.00
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.3	3.89	3.56	3.33	4.56	5.00
LassoJoint_BFGS_(log(p)/n)^(1/2)	4.44	4.22	5.00	2.56	5.44
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.5	4.89	4.11	3.44	5.78	4.78
LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	5.44	5.33	5.56	3.11	6.00
LassoJoint_BFGS_lambda.min delta_to_lambda = 0.7	5.00	4.33	4.56	6.22	6.11
LassoJoint_BFGS_lambda.min delta_to_lambda = 1	5.67	5.56	5.44	6.56	6.67
LassoJoint_BFGS_(log(p)/n)^(1/3)	6.44	7.67	7.67	6.67	5.33
Naive	8.22	8.78	8.56	7.33	3.67

Table 11. No. of features in lambda-fixed scenarios; dataset 'Banknote'

dataset	method	c	no_features
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.01
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	2.00
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	2.87
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	3.00
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	3.00
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.10	0.01
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.30	2.00
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.50	2.88
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.70	3.00
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.90	3.00
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.10	0.00
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.30	1.00
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.50	1.00
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.70	1.39
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.90	2.00

Table 12. No. of features in lambda-fixed scenarios; dataset 'Breastc'

dataset	method	c	no_features
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	2.91
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	5.45
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	5.55
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	6.01
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.10	0.00
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.30	3.11
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.50	5.69
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.70	5.64
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.90	6.11
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.10	0.00
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.30	0.00
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.50	2.60
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.70	4.07
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.90	3.04

Table 13. No. of features in lambda-fixed scenarios; dataset 'Credit_a'

dataset	method	c	no_features
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	1.00
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	1.01
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	1.02
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	2.32
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.10	0.00
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.30	1.00
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.50	1.02
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.70	1.05
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.90	2.34
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.10	0.00
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.30	0.00
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.50	0.93
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.70	1.00
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.90	1.00

Table 14. No. of features in lambda-fixed scenarios; dataset 'Credit_g'

dataset	method	c	no_features
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	0.03
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	1.33
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	2.26
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	3.04
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.10	0.00
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.30	0.12
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.50	1.80
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.70	2.41
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.90	3.10
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.10	0.00
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.30	0.00
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.50	0.00
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.70	0.00
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.90	0.02

Table 15. No. of features in lambda-fixed scenarios; dataset 'dhfr'

dataset	method	c	no_features
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	1.05
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	3.92
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.10	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.30	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.50	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.70	1.26
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.90	4.32
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.10	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.30	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.50	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.70	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.90	0.00

Table 16. No. of features in lambda-fixed scenarios; dataset 'Diabetes'

dataset	method	c	no_features
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	0.99
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	1.42
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	2.55
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	3.94
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.10	0.00
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.30	0.99
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.50	1.55
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.70	2.65
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.90	4.01
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.10	0.00
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.30	0.00
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.50	0.00
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.70	0.73
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.90	1.00

Table 17. No. of features in lambda-fixed scenarios; dataset 'Spambase'

dataset	method	c	no_features
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	7.15
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	15.03
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	18.91
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	22.66
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.10	0.00
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.30	7.18
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.50	15.29
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.70	19.14
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.90	22.80
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.10	0.00
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.30	0.00
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.50	0.01
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.70	3.35
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.90	4.92

Table 18. No. of features in lambda-fixed scenarios; dataset 'Vote'

dataset	method	c	no_features
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	2.35
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	1.41
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	2.04
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	2.47
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.10	0.00
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.30	2.55
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.50	1.45
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.70	2.33
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.90	2.62
Vote	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.10	0.00
Vote	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.30	0.00
Vote	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.50	0.01
Vote	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.70	1.16
Vote	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.90	1.42

Table 19. No. of features in lambda-fixed scenarios; dataset 'Wdbc'

dataset	method	c	no_features
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	1.87
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	2.60
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	4.11
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	3.70
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.10	0.00
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.30	1.96
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.50	2.63
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.70	4.23
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)_dtl=0	0.90	3.73
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.10	0.00
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.30	0.00
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.50	0.63
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.70	2.12
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/3)	0.90	2.51

3 Results of the joint-wise methods for the low-dimensional datasets

Table 20. Accuracy score on 'Artif' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.52(0.02)	0.78(0.05)	0.89(0.02)	0.88(0.04)	0.86(0.08)
LassoJoint_BFGS_lambda.1se	0.55(0.09)	0.88(0.01)	0.89(0.02)	0.88(0.04)	0.87(0.08)
LassoJoint_BFGS_lambda.min	0.82(0.03)	0.87(0.02)	0.88(0.02)	0.81(0.14)	0.75(0.16)
LassoJoint_MM_(log(p)/n)^(1/2)	0.48(0.02)	0.78(0.05)	0.87(0.09)	0.89(0.02)	0.89(0.01)
LassoJoint_MM_lambda.1se	0.51(0.09)	0.87(0.02)	0.87(0.09)	0.89(0.02)	0.89(0.01)
LassoJoint_MM_lambda.min	0.73(0.04)	0.85(0.02)	0.86(0.09)	0.88(0.02)	0.88(0.01)
MIF5 Joint BFGS	0.75(0.06)	0.87(0.02)	0.89(0.01)	0.88(0.06)	0.61(0.12)
MIF5 Joint MM	0.72(0.04)	0.85(0.02)	0.89(0.01)	0.89(0.01)	0.89(0.01)

Table 21. Accuracy score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.55(0.08)	0.87(0.02)	0.99(0.02)	0.99(0)	0.98(0.05)
LassoJoint_BFGS_lambda.1se	0.57(0.11)	0.99(0.03)	0.99(0.01)	0.99(0)	0.98(0.06)
LassoJoint_BFGS_lambda.min	0.97(0.02)	0.99(0)	0.99(0.01)	0.99(0)	0.98(0.05)
LassoJoint_MM_(log(p)/n)^(1/2)	0.48(0.09)	0.86(0.02)	0.99(0.02)	0.99(0.01)	1(0)
LassoJoint_MM_lambda.1se	0.5(0.13)	0.95(0.05)	0.99(0.01)	0.99(0.01)	1(0)
LassoJoint_MM_lambda.min	0.97(0.01)	0.98(0.01)	0.99(0.01)	0.99(0.01)	1(0)
MIF5 Joint BFGS	0.99(0.02)	0.99(0.01)	0.99(0)	0.99(0)	0.95(0.09)
MIF5 Joint MM	0.94(0.04)	0.98(0.01)	0.99(0.01)	0.99(0.01)	1(0)

Table 22. Accuracy score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.55(0.05)	0.9(0.06)	0.88(0.09)	0.95(0.02)	0.85(0.17)
LassoJoint_BFGS_lambda.1se	0.59(0.1)	0.9(0.07)	0.88(0.1)	0.95(0.02)	0.83(0.18)
LassoJoint_BFGS_lambda.min	0.9(0.08)	0.91(0.04)	0.87(0.11)	0.94(0.03)	0.84(0.18)
LassoJoint_MM_(log(p)/n)^(1/2)	0.55(0.05)	0.92(0.03)	0.89(0.07)	0.95(0.02)	0.95(0.02)
LassoJoint_MM_lambda.1se	0.59(0.11)	0.93(0.03)	0.89(0.07)	0.95(0.02)	0.95(0.02)
LassoJoint_MM_lambda.min	0.91(0.04)	0.93(0.03)	0.88(0.08)	0.95(0.02)	0.95(0.02)
MIF5 Joint BFGS	0.86(0.05)	0.9(0.04)	0.91(0.06)	0.91(0.04)	0.76(0.09)
MIF5 Joint MM	0.86(0.05)	0.89(0.04)	0.92(0.05)	0.91(0.03)	0.92(0.03)

Table 23. Accuracy score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.45(0.04)	0.48(0.11)	0.83(0.11)	0.86(0.03)	0.86(0.03)
LassoJoint_BFGS_lambda.1se	0.45(0.04)	0.48(0.11)	0.83(0.11)	0.86(0.03)	0.74(0.13)
LassoJoint_BFGS_lambda.min	0.53(0.14)	0.73(0.18)	0.82(0.1)	0.8(0.11)	0.67(0.11)
LassoJoint_MM_(log(p)/n)^(1/2)	0.45(0.04)	0.87(0.03)	0.86(0.02)	0.86(0.03)	0.86(0.03)
LassoJoint_MM_lambda.1se	0.45(0.04)	0.85(0.09)	0.86(0.02)	0.86(0.03)	0.86(0.03)
LassoJoint_MM_lambda.min	0.62(0.17)	0.84(0.05)	0.84(0.03)	0.85(0.04)	0.86(0.03)
MIF5 Joint BFGS	0.66(0.19)	0.85(0.04)	0.84(0.05)	0.86(0.03)	0.86(0.03)
MIF5 Joint MM	0.82(0.1)	0.85(0.03)	0.85(0.03)	0.85(0.03)	0.85(0.03)

Table 24. Accuracy score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.7(0.03)	0.64(0.16)	0.57(0.17)	0.64(0.13)	0.72(0.07)
LassoJoint_BFGS_lambda.1se	0.7(0.03)	0.66(0.14)	0.62(0.16)	0.66(0.13)	0.73(0.04)
LassoJoint_BFGS_lambda.min	0.68(0.08)	0.64(0.17)	0.67(0.1)	0.73(0.04)	0.73(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	0.3(0.03)	0.31(0.08)	0.64(0.04)	0.67(0.05)	0.74(0.02)
LassoJoint_MM_lambda.1se	0.3(0.03)	0.29(0.03)	0.67(0.06)	0.7(0.04)	0.75(0.02)
LassoJoint_MM_lambda.min	0.32(0.08)	0.67(0.11)	0.67(0.05)	0.73(0.04)	0.75(0.02)
MIF5 Joint BFGS	0.53(0.17)	0.43(0.18)	0.52(0.18)	0.73(0.03)	0.74(0.03)
MIF5 Joint MM	0.53(0.08)	0.54(0.13)	0.59(0.1)	0.73(0.03)	0.74(0.03)

Table 25. Accuracy score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.55(0.12)	0.58(0.09)	0.71(0.1)	0.78(0.02)	0.85(0.04)
LassoJoint_BFGS_lambda.1se	0.55(0.12)	0.58(0.1)	0.84(0.02)	0.77(0.08)	0.88(0.05)
LassoJoint_BFGS_lambda.min	0.49(0.08)	0.74(0.05)	0.82(0.04)	0.74(0.09)	0.83(0.1)
LassoJoint_MM_(log(p)/n)^(1/2)	0.39(0.05)	0.42(0.09)	0.71(0.1)	0.78(0.03)	0.86(0.03)
LassoJoint_MM_lambda.1se	0.39(0.05)	0.5(0.18)	0.8(0.05)	0.85(0.03)	0.89(0.01)
LassoJoint_MM_lambda.min	0.49(0.19)	0.66(0.07)	0.81(0.04)	0.84(0.03)	0.87(0.04)
MIF5 Joint BFGS	0.51(0.19)	0.75(0.07)	0.78(0.05)	0.71(0.19)	0.73(0.1)
MIF5 Joint MM	0.51(0.19)	0.75(0.07)	0.74(0.05)	0.73(0.17)	0.76(0.09)

Table 26. Accuracy score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.35(0.04)	0.74(0.03)	0.76(0.04)	0.64(0.18)	0.36(0.09)
LassoJoint_BFGS_lambda.1se	0.35(0.04)	0.45(0.17)	0.76(0.04)	0.64(0.18)	0.36(0.08)
LassoJoint_BFGS_lambda.min	0.61(0.1)	0.75(0.03)	0.76(0.04)	0.57(0.2)	0.36(0.06)
LassoJoint_MM_(log(p)/n)^(1/2)	0.35(0.04)	0.73(0.04)	0.77(0.04)	0.75(0.03)	0.76(0.03)
LassoJoint_MM_lambda.1se	0.35(0.04)	0.4(0.13)	0.76(0.07)	0.75(0.03)	0.76(0.03)
LassoJoint_MM_lambda.min	0.61(0.07)	0.74(0.04)	0.76(0.03)	0.75(0.03)	0.77(0.03)
MIF5 Joint BFGS	0.73(0.03)	0.74(0.04)	0.75(0.03)	0.77(0.03)	0.36(0.04)
MIF5 Joint MM	0.7(0.07)	0.75(0.04)	0.75(0.03)	0.77(0.03)	0.75(0.03)

Table 27. Accuracy score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.61(0.01)	0.43(0.12)	0.69(0.25)	0.5(0.21)	0.7(0.22)
LassoJoint_BFGS_lambda.1se	0.69(0.16)	0.86(0.09)	0.85(0.16)	0.41(0.07)	0.67(0.23)
LassoJoint_BFGS_lambda.min	0.82(0.03)	0.88(0.02)	0.86(0.14)	0.4(0.07)	0.67(0.25)
LassoJoint_MM_(log(p)/n)^(1/2)	0.39(0.01)	0.44(0.12)	0.86(0.05)	0.89(0.01)	0.91(0.01)
LassoJoint_MM_lambda.1se	0.51(0.13)	0.84(0.05)	0.89(0.01)	0.9(0.01)	0.92(0.01)
LassoJoint_MM_lambda.min	0.62(0.05)	0.84(0.02)	0.89(0.01)	0.9(0.01)	0.92(0.01)
MIF5 Joint BFGS	0.43(0.05)	0.58(0.06)	0.51(0.07)	0.59(0.04)	0.52(0.04)
MIF5 Joint MM	0.43(0.03)	0.58(0.06)	0.51(0.07)	0.82(0.02)	0.84(0.01)

Table 28. Accuracy score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.68(0.07)	0.4(0.22)	0.92(0.03)	0.88(0.18)	0.93(0.03)
LassoJoint_BFGS_lambda.1se	0.68(0.07)	0.51(0.29)	0.92(0.03)	0.93(0.04)	0.93(0.03)
LassoJoint_BFGS_lambda.min	0.77(0.14)	0.66(0.27)	0.89(0.05)	0.93(0.03)	0.9(0.04)
LassoJoint_MM_(log(p)/n)^(1/2)	0.32(0.07)	0.95(0.03)	0.91(0.04)	0.93(0.03)	0.93(0.03)
LassoJoint_MM_lambda.1se	0.32(0.07)	0.93(0.09)	0.92(0.04)	0.93(0.03)	0.93(0.03)
LassoJoint_MM_lambda.min	0.64(0.19)	0.67(0.2)	0.89(0.06)	0.93(0.04)	0.92(0.03)

Table 29. Accuracy score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.36(0.04)	0.92(0.02)	0.93(0.03)	0.94(0.02)	0.67(0.28)
LassoJoint_BFGS_lambda.1se	0.36(0.04)	0.93(0.03)	0.94(0.02)	0.91(0.12)	0.63(0.17)
LassoJoint_BFGS_lambda.min	0.77(0.1)	0.71(0.25)	0.93(0.03)	0.67(0.24)	0.58(0.16)
LassoJoint_MM_(log(p)/n)^(1/2)	0.36(0.04)	0.9(0.03)	0.92(0.03)	0.94(0.02)	0.96(0.02)
LassoJoint_MM_lambda.1se	0.36(0.04)	0.9(0.04)	0.93(0.03)	0.94(0.02)	0.97(0.02)
LassoJoint_MM_lambda.min	0.64(0.08)	0.72(0.21)	0.88(0.06)	0.91(0.04)	0.97(0.02)
MIF5 Joint BFGS	0.82(0.18)	0.92(0.03)	0.93(0.02)	0.9(0.1)	0.52(0.24)
MIF5 Joint MM	0.73(0.14)	0.9(0.03)	0.93(0.02)	0.92(0.03)	0.95(0.02)

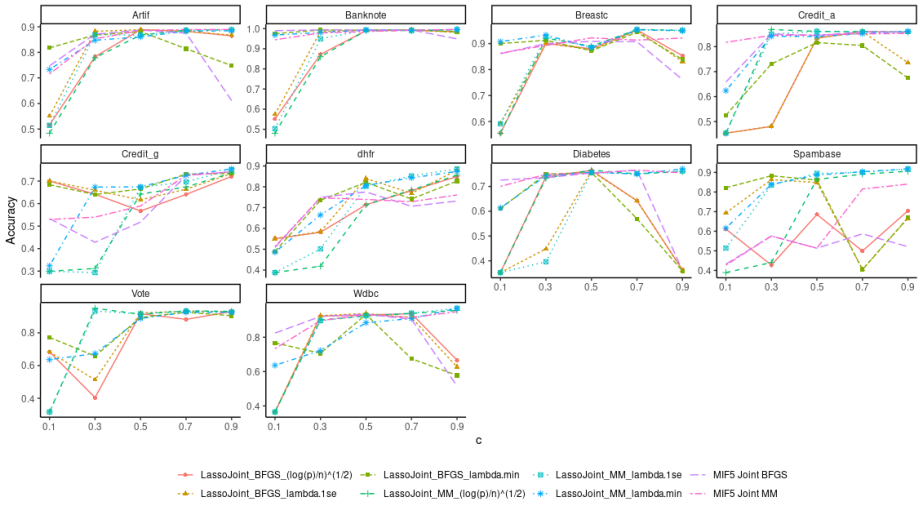

Fig. 2. The accuracy for the test datasets

4 Results for the low-dimensional datasets

Table 30. Accuracy score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.76(0.06)	0.71(0.1)	0.88(0.01)	0.97(0.02)	0.99(0.01)
AdaS_svm	0.82(0.05)	0.8(0.03)	0.95(0)	0.97(0.01)	1(0)
Joint BFGS	1(0)	1(0)	0.98(0)	1(0)	1(0.01)
Joint MM	0.96(0.01)	0.97(0)	0.96(0)	0.97(0.01)	0.99(0)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.91(0.27)	0.87(0.05)	1(0.02)	1(0)	0.98(0.08)
LassoJoint_BFGS_lambda.1se	0.94(0.12)	1(0.01)	0.98(0.01)	1(0)	0.99(0.03)
LassoJoint_BFGS_lambda.min	1(0.01)	1(0)	0.98(0.01)	1(0)	0.99(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	0.04(0.17)	0.81(0.04)	0.98(0.03)	0.98(0.01)	0.99(0.01)
LassoJoint_MM_lambda.1se	0.39(0.31)	0.96(0.03)	0.97(0.01)	0.98(0.01)	0.99(0)
LassoJoint_MM_lambda.min	0.95(0.01)	0.97(0.01)	0.97(0.01)	0.98(0.01)	0.99(0)
Naive	0(0)	0(0)	0.4(0.01)	0.88(0.01)	0.98(0)
Oracle	1(0)	1(0)	1(0)	1(0)	1(0.01)
Weighted BFGS	0.98(0.02)	0.98(0.01)	0.97(0)	0.99(0)	1(0.01)

Table 31. Accuracy score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.56(0.15)	0.75(0.01)	0.92(0.04)	0.95(0.02)	0.88(0.04)
AdaS_svm	0.64(0.16)	0.75(0.03)	0.79(0.03)	0.91(0.02)	0.87(0.05)
Joint BFGS	0.56(0.39)	0.82(0.09)	0.96(0.02)	0.96(0.01)	0.56(0.4)
Joint MM	0.73(0.06)	0.69(0.07)	0.94(0.03)	0.95(0.01)	0.87(0.05)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.89(0.14)	0.75(0.2)	0.94(0.04)	0.71(0.4)
LassoJoint_BFGS_lambda.1se	0.35(0.34)	0.86(0.05)	0.88(0.1)	0.95(0.02)	0.59(0.35)
LassoJoint_BFGS_lambda.min	0.84(0.09)	0.87(0.02)	0.9(0.11)	0.95(0.02)	0.82(0.17)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.88(0.07)	0.77(0.14)	0.94(0.04)	0.93(0.04)
LassoJoint_MM_lambda.1se	0.4(0.31)	0.82(0.03)	0.87(0.07)	0.95(0.02)	0.88(0.05)
LassoJoint_MM_lambda.min	0.78(0.08)	0.78(0.05)	0.88(0.08)	0.95(0.02)	0.88(0.05)
Naive	0(0.01)	0(0)	0.43(0.07)	0.88(0.03)	0.84(0.05)
Oracle	0.97(0.04)	0.97(0.01)	0.97(0.01)	0.97(0.02)	0.97(0.05)
Weighted BFGS	0.48(0.34)	0.84(0.1)	0.93(0.04)	0.94(0.01)	0.57(0.41)

Table 32. Accuracy score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.34(0.02)	0.66(0.01)	0.75(0.06)	0.71(0.07)	0.87(0.03)
AdaS_svm	0.16(0.02)	0.65(0.02)	0.76(0.05)	0.77(0.03)	0.83(0.03)
Joint BFGS	0(0)	0.02(0.14)	0.39(0.42)	0.86(0.04)	0.29(0.3)
Joint MM	0.22(0.02)	0.16(0.11)	0.8(0.05)	0.81(0.02)	0.91(0.04)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.05(0.2)	0.75(0.2)	0.8(0.04)	0.79(0.04)
LassoJoint_BFGS_lambda.1se	0(0)	0.58(0.21)	0.28(0.3)	0.84(0.06)	0.73(0.16)
LassoJoint_BFGS_lambda.min	0.73(0.23)	0.6(0.13)	0.56(0.33)	0.83(0.1)	0.55(0.09)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.8(0.04)	0.8(0.04)	0.8(0.04)	0.79(0.04)
LassoJoint_MM_lambda.1se	0(0)	0.64(0.08)	0.82(0.04)	0.8(0.03)	0.83(0.04)
LassoJoint_MM_lambda.min	0.33(0.12)	0.64(0.05)	0.82(0.05)	0.81(0.03)	0.87(0.05)
Naive	0(0)	0.11(0.01)	0.36(0.07)	0.52(0.07)	0.89(0.04)
Oracle	0.92(0)	0.92(0.01)	0.92(0.04)	0.92(0.07)	0.92(0.03)
Weighted BFGS	0(0)	0.02(0.14)	0.36(0.39)	0.86(0.04)	0.46(0.11)

Table 33. Accuracy score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.56(0.1)	0.45(0.05)	0.53(0.04)	0.58(0.01)	0.64(0.03)
AdaS_svm	0.34(0.15)	0.38(0.09)	0.47(0.05)	0.61(0.01)	0.65(0.05)
Joint BFGS	0.65(0.05)	0.76(0.05)	0.82(0.24)	0.77(0.02)	0.75(0.06)
Joint MM	0.45(0.06)	0.66(0.05)	0.75(0.13)	0.66(0.03)	0.8(0.04)
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	0.84(0.37)	0.53(0.35)	0.65(0.26)	0.81(0.13)
LassoJoint_BFGS_lambda.1se	1(0)	0.61(0.43)	0.43(0.33)	0.23(0.18)	0.78(0.03)
LassoJoint_BFGS_lambda.min	0.36(0.25)	0.42(0.3)	0.67(0.22)	0.6(0.08)	0.75(0.05)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.03(0.12)	0.59(0.09)	0.69(0.12)	0.83(0.03)
LassoJoint_MM_lambda.1se	0(0)	0(0)	0.61(0.09)	0.6(0.06)	0.81(0.03)
LassoJoint_MM_lambda.min	0.15(0.14)	0.56(0.2)	0.7(0.12)	0.63(0.07)	0.81(0.04)
Naive	0(0)	0.01(0.01)	0.2(0.04)	0.6(0.02)	0.8(0.04)
Oracle	0.91(0.01)	0.91(0.04)	0.91(0.02)	0.91(0)	0.91(0.03)
Weighted BFGS	0.68(0.06)	0.79(0.06)	0.79(0.23)	0.75(0.01)	0.79(0.04)

Table 34. Accuracy score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.72(0.13)	0.54(0.09)	0.77(0.11)	0.83(0.04)	0.88(0.01)
AdaS_svm	0.04(0.04)	0.19(0.31)	0.62(0.16)	0.79(0.06)	0.74(0.02)
Joint BFGS	0.21(0.1)	0.25(0.11)	0.46(0.22)	0.67(0.06)	0.74(0.02)
Joint MM	0.3(0.04)	0.41(0.06)	0.53(0.08)	0.64(0.08)	0.62(0.02)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.6(0.55)	1(0)	0.69(0.15)	0.89(0.04)	0.9(0.03)
LassoJoint_BFGS_lambda.1se	0.74(0.43)	0.8(0.14)	0.74(0.17)	0.93(0.03)	0.88(0.01)
LassoJoint_BFGS_lambda.min	0.28(0.18)	0.37(0.31)	0.65(0.22)	0.71(0.13)	0.76(0.02)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0(0)	0.69(0.14)	0.88(0.03)	0.91(0.04)
LassoJoint_MM_lambda.1se	0(0)	0.48(0.29)	0.79(0.03)	0.93(0.03)	0.83(0.01)
LassoJoint_MM_lambda.min	0.13(0.1)	0.36(0.18)	0.69(0.09)	0.82(0.11)	0.72(0.03)
Naive	0.17(0.03)	0.26(0.04)	0.49(0.06)	0.65(0.03)	0.72(0.01)
Oracle	0.94(0.04)	0.94(0.03)	0.94(0.03)	0.94(0.03)	0.94(0)
Weighted BFGS	0.21(0.06)	0.33(0.11)	0.53(0.12)	0.62(0.04)	0.74(0.03)

Table 35. Accuracy score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.49(0.05)	0.59(0.01)	0.61(0.01)	0.69(0.02)	0.76(0.05)
AdaS_svm	0.2(0.18)	0.51(0.02)	0.55(0)	0.67(0.02)	0.7(0.05)
Joint BFGS	0.89(0.04)	0.72(0.02)	0.91(0.04)	0.8(0.14)	0.44(0.42)
Joint MM	0.78(0.01)	0.69(0.02)	0.89(0.02)	0.81(0.05)	0.9(0.03)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.88(0.05)	0.87(0.05)	0.59(0.35)	0.04(0.17)
LassoJoint_BFGS_lambda.1se	0(0)	0.06(0.17)	0.91(0.02)	0.8(0.17)	0.68(0.23)
LassoJoint_BFGS_lambda.min	0.82(0.15)	0.73(0.05)	0.89(0.03)	0.71(0.18)	0.18(0.3)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.82(0.05)	0.86(0.05)	0.8(0.04)	0.87(0.04)
LassoJoint_MM_lambda.1se	0(0)	0.57(0.2)	0.9(0.05)	0.87(0.05)	0.89(0.03)
LassoJoint_MM_lambda.min	0.71(0.09)	0.69(0.04)	0.86(0.02)	0.81(0.03)	0.9(0.03)
Naive	0(0)	0(0)	0.08(0.01)	0.58(0.01)	0.84(0.05)
Oracle	0.91(0)	0.91(0.01)	0.91(0)	0.91(0.01)	0.91(0.03)
Weighted BFGS	0.92(0.01)	0.72(0.02)	0.91(0.04)	0.83(0.14)	0.51(0.38)

Table 36. Accuracy score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.45(0.03)	0.71(0.03)	0.79(0.03)	0.84(0.02)	0.9(0.01)
AdaS_svm	0.4(0.06)	0.68(0.03)	0.78(0.02)	0.86(0.02)	0.93(0)
Joint BFGS	0.84(0.01)	0.91(0.02)	0.75(0.34)	0.01(0.01)	0.02(0.13)
Joint MM	0.42(0.05)	0.79(0.03)	0.89(0.01)	0.93(0.01)	0.94(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	0.07(0.2)	0.55(0.44)	0.2(0.39)	0.56(0.4)
LassoJoint_BFGS_lambda.1se	0.16(0.19)	0.91(0.06)	0.83(0.23)	0.03(0.09)	0.75(0.23)
LassoJoint_BFGS_lambda.min	0.75(0.06)	0.91(0.02)	0.91(0.09)	0.02(0.05)	0.48(0.41)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.09(0.2)	0.85(0.1)	0.92(0.02)	0.94(0.01)
LassoJoint_MM_lambda.1se	0.23(0.19)	0.79(0.06)	0.89(0.01)	0.93(0.01)	0.95(0.01)
LassoJoint_MM_lambda.min	0.37(0.07)	0.77(0.04)	0.88(0.01)	0.93(0.01)	0.94(0.01)
Naive	0(0)	0.02(0.01)	0.28(0.03)	0.85(0.01)	0.92(0.01)
Oracle	0.95(0.01)	0.95(0.01)	0.95(0.01)	0.95(0)	0.95(0)
Weighted BFGS	0.81(0.01)	0.9(0.02)	0.74(0.31)	0.08(0.02)	0.12(0.11)

Table 37. Accuracy score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.65(0.17)	0.8(0.05)	0.76(0.05)	0.9(0.01)	0.85(0.01)
AdaS_svm	0.44(0.26)	0.66(0.11)	0.72(0.07)	0.9(0.01)	0.89(0.01)
Joint BFGS	0.51(0.05)	0.36(0.16)	0.73(0.07)	0.88(0.02)	0.87(0.02)
Joint MM	0.23(0.08)	0.33(0.09)	0.73(0.07)	0.86(0.01)	0.85(0.03)
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	0.13(0.32)	0.91(0.05)	0.85(0.26)	0.92(0.04)
LassoJoint_BFGS_lambda.1se	0.79(0.33)	0.45(0.35)	0.85(0.05)	0.91(0.02)	0.89(0.02)
LassoJoint_BFGS_lambda.min	0.66(0.11)	0.44(0.27)	0.83(0.05)	0.94(0.02)	0.9(0.04)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.95(0.03)	0.9(0.06)	0.93(0.04)	0.92(0.04)
LassoJoint_MM_lambda.1se	0.24(0.34)	0.76(0.14)	0.84(0.05)	0.94(0.02)	0.9(0.02)
LassoJoint_MM_lambda.min	0.43(0.13)	0.34(0.15)	0.8(0.04)	0.89(0.02)	0.9(0.02)
Naive	0.03(0.02)	0.17(0.05)	0.43(0.08)	0.64(0.01)	0.82(0.03)
Oracle	0.95(0.05)	0.95(0.04)	0.95(0.05)	0.95(0.01)	0.95(0.03)
Weighted BFGS	0.48(0.04)	0.38(0.18)	0.72(0.07)	0.83(0)	0.81(0.03)

Table 38. Accuracy score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.59(0.03)	0.78(0.03)	0.77(0.09)	0.94(0.02)	0.97(0.02)
AdaS_svm	0.73(0.02)	0.78(0.03)	0.72(0.06)	0.9(0.04)	0.99(0.01)
Joint BFGS	0.03(0.07)	0.83(0.01)	0.53(0.38)	0.02(0.04)	0.24(0.13)
Joint MM	0.02(0.03)	0.7(0.02)	0.73(0.05)	0.91(0.04)	0.96(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.91(0.03)	0.95(0.05)	0.96(0.02)	0.49(0.46)
LassoJoint_BFGS_lambda.1se	0(0)	0.96(0.03)	0.89(0.07)	0.75(0.31)	0.23(0.26)
LassoJoint_BFGS_lambda.min	0.66(0.06)	0.85(0.18)	0.84(0.05)	0.53(0.36)	0.18(0.14)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.86(0.05)	0.92(0.05)	0.94(0.03)	0.97(0.02)
LassoJoint_MM_lambda.1se	0(0)	0.89(0.03)	0.82(0.07)	0.95(0.02)	0.98(0.01)
LassoJoint_MM_lambda.min	0.15(0.11)	0.81(0.15)	0.78(0.05)	0.92(0.04)	0.98(0.01)
Naive	0.04(0)	0.07(0.01)	0.3(0.04)	0.83(0.02)	0.96(0.01)
Oracle	1(0)	1(0.01)	1(0.01)	1(0.02)	1(0.01)
Weighted BFGS	0.02(0.06)	0.75(0.02)	0.51(0.36)	0.15(0.06)	0.63(0.07)

Table 39. Recall score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.76(0.06)	0.71(0.1)	0.88(0.01)	0.97(0.02)	0.99(0.01)
AdaS_svm	0.82(0.05)	0.8(0.03)	0.95(0)	0.97(0.01)	1(0)
Joint BFGS	1(0)	1(0)	0.98(0)	1(0)	1(0.01)
Joint MM	0.96(0.01)	0.97(0)	0.96(0)	0.97(0.01)	0.99(0)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.91(0.27)	0.87(0.05)	1(0.02)	1(0)	0.98(0.08)
LassoJoint_BFGS_lambda.1se	0.94(0.12)	1(0.01)	0.98(0.01)	1(0)	0.99(0.03)
LassoJoint_BFGS_lambda.min	1(0.01)	1(0)	0.98(0.01)	1(0)	0.99(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	0.04(0.17)	0.81(0.04)	0.98(0.03)	0.98(0.01)	0.99(0.01)
LassoJoint_MM_lambda.1se	0.39(0.31)	0.96(0.03)	0.97(0.01)	0.98(0.01)	0.99(0)
LassoJoint_MM_lambda.min	0.95(0.01)	0.97(0.01)	0.97(0.01)	0.98(0.01)	0.99(0)
Naive	0(0)	0(0)	0.4(0.01)	0.88(0.01)	0.98(0)
Oracle	1(0)	1(0)	1(0)	1(0)	1(0.01)
Weighted BFGS	0.98(0.02)	0.98(0.01)	0.97(0)	0.99(0)	1(0.01)

Table 40. Recall score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.56(0.15)	0.75(0.01)	0.92(0.04)	0.95(0.02)	0.88(0.04)
AdaS_svm	0.64(0.16)	0.75(0.03)	0.79(0.03)	0.91(0.02)	0.87(0.05)
Joint BFGS	0.56(0.39)	0.82(0.09)	0.96(0.02)	0.96(0.01)	0.56(0.4)
Joint MM	0.73(0.06)	0.69(0.07)	0.94(0.03)	0.95(0.01)	0.87(0.05)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.89(0.14)	0.75(0.2)	0.94(0.04)	0.71(0.4)
LassoJoint_BFGS_lambda.1se	0.35(0.34)	0.86(0.05)	0.88(0.1)	0.95(0.02)	0.59(0.35)
LassoJoint_BFGS_lambda.min	0.84(0.09)	0.87(0.02)	0.9(0.11)	0.95(0.02)	0.82(0.17)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.88(0.07)	0.77(0.14)	0.94(0.04)	0.93(0.04)
LassoJoint_MM_lambda.1se	0.4(0.31)	0.82(0.03)	0.87(0.07)	0.95(0.02)	0.88(0.05)
LassoJoint_MM_lambda.min	0.78(0.08)	0.78(0.05)	0.88(0.08)	0.95(0.02)	0.88(0.05)
Naive	0(0.01)	0(0)	0.43(0.07)	0.88(0.03)	0.84(0.05)
Oracle	0.97(0.04)	0.97(0.01)	0.97(0.01)	0.97(0.02)	0.97(0.05)
Weighted BFGS	0.48(0.34)	0.84(0.1)	0.93(0.04)	0.94(0.01)	0.57(0.41)

Table 41. Recall score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.34(0.02)	0.66(0.01)	0.75(0.06)	0.71(0.07)	0.87(0.03)
AdaS_svm	0.16(0.02)	0.65(0.02)	0.76(0.05)	0.77(0.03)	0.83(0.03)
Joint BFGS	0(0)	0.02(0.14)	0.39(0.42)	0.86(0.04)	0.29(0.3)
Joint MM	0.22(0.02)	0.16(0.11)	0.8(0.05)	0.81(0.02)	0.91(0.04)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.05(0.2)	0.75(0.2)	0.8(0.04)	0.79(0.04)
LassoJoint_BFGS_lambda.1se	0(0)	0.58(0.21)	0.28(0.3)	0.84(0.06)	0.73(0.16)
LassoJoint_BFGS_lambda.min	0.73(0.23)	0.6(0.13)	0.56(0.33)	0.83(0.1)	0.55(0.09)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.8(0.04)	0.8(0.04)	0.8(0.04)	0.79(0.04)
LassoJoint_MM_lambda.1se	0(0)	0.64(0.08)	0.82(0.04)	0.8(0.03)	0.83(0.04)
LassoJoint_MM_lambda.min	0.33(0.12)	0.64(0.05)	0.82(0.05)	0.81(0.03)	0.87(0.05)
Naive	0(0)	0.11(0.01)	0.36(0.07)	0.52(0.07)	0.89(0.04)
Oracle	0.92(0)	0.92(0.01)	0.92(0.04)	0.92(0.07)	0.92(0.03)
Weighted BFGS	0(0)	0.02(0.14)	0.36(0.39)	0.86(0.04)	0.46(0.11)

Table 42. Recall score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.56(0.1)	0.45(0.05)	0.53(0.04)	0.58(0.01)	0.64(0.03)
AdaS_svm	0.34(0.15)	0.38(0.09)	0.47(0.05)	0.61(0.01)	0.65(0.05)
Joint BFGS	0.65(0.05)	0.76(0.05)	0.82(0.24)	0.77(0.02)	0.75(0.06)
Joint MM	0.45(0.06)	0.66(0.05)	0.75(0.13)	0.66(0.03)	0.8(0.04)
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	0.84(0.37)	0.53(0.35)	0.65(0.26)	0.81(0.13)
LassoJoint_BFGS_lambda.1se	1(0)	0.61(0.43)	0.43(0.33)	0.23(0.18)	0.78(0.03)
LassoJoint_BFGS_lambda.min	0.36(0.25)	0.42(0.3)	0.67(0.22)	0.6(0.08)	0.75(0.05)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.03(0.12)	0.59(0.09)	0.69(0.12)	0.83(0.03)
LassoJoint_MM_lambda.1se	0(0)	0(0)	0.61(0.09)	0.6(0.06)	0.81(0.03)
LassoJoint_MM_lambda.min	0.15(0.14)	0.56(0.2)	0.7(0.12)	0.63(0.07)	0.81(0.04)
Naive	0(0)	0.01(0.01)	0.2(0.04)	0.6(0.02)	0.8(0.04)
Oracle	0.91(0.01)	0.91(0.04)	0.91(0.02)	0.91(0)	0.91(0.03)
Weighted BFGS	0.68(0.06)	0.79(0.06)	0.79(0.23)	0.75(0.01)	0.79(0.04)

Table 43. Recall score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.72(0.13)	0.54(0.09)	0.77(0.11)	0.83(0.04)	0.88(0.01)
AdaS_svm	0.04(0.04)	0.19(0.31)	0.62(0.16)	0.79(0.06)	0.74(0.02)
Joint BFGS	0.21(0.1)	0.25(0.11)	0.46(0.22)	0.67(0.06)	0.74(0.02)
Joint MM	0.3(0.04)	0.41(0.06)	0.53(0.08)	0.64(0.08)	0.62(0.02)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.6(0.55)	1(0)	0.69(0.15)	0.89(0.04)	0.9(0.03)
LassoJoint_BFGS_lambda.1se	0.74(0.43)	0.8(0.14)	0.74(0.17)	0.93(0.03)	0.88(0.01)
LassoJoint_BFGS_lambda.min	0.28(0.18)	0.37(0.31)	0.65(0.22)	0.71(0.13)	0.76(0.02)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0(0)	0.69(0.14)	0.88(0.03)	0.91(0.04)
LassoJoint_MM_lambda.1se	0(0)	0.48(0.29)	0.79(0.03)	0.93(0.03)	0.83(0.01)
LassoJoint_MM_lambda.min	0.13(0.1)	0.36(0.18)	0.69(0.09)	0.82(0.11)	0.72(0.03)
Naive	0.17(0.03)	0.26(0.04)	0.49(0.06)	0.65(0.03)	0.72(0.01)
Oracle	0.94(0.04)	0.94(0.03)	0.94(0.03)	0.94(0.03)	0.94(0)
Weighted BFGS	0.21(0.06)	0.33(0.11)	0.53(0.12)	0.62(0.04)	0.74(0.03)

Table 44. Recall score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.49(0.05)	0.59(0.01)	0.61(0.01)	0.69(0.02)	0.76(0.05)
AdaS_svm	0.2(0.18)	0.51(0.02)	0.55(0)	0.67(0.02)	0.7(0.05)
Joint BFGS	0.89(0.04)	0.72(0.02)	0.91(0.04)	0.8(0.14)	0.44(0.42)
Joint MM	0.78(0.01)	0.69(0.02)	0.89(0.02)	0.81(0.05)	0.9(0.03)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.88(0.05)	0.87(0.05)	0.59(0.35)	0.04(0.17)
LassoJoint_BFGS_lambda.1se	0(0)	0.06(0.17)	0.91(0.02)	0.8(0.17)	0.68(0.23)
LassoJoint_BFGS_lambda.min	0.82(0.15)	0.73(0.05)	0.89(0.03)	0.71(0.18)	0.18(0.3)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.82(0.05)	0.86(0.05)	0.8(0.04)	0.87(0.04)
LassoJoint_MM_lambda.1se	0(0)	0.57(0.2)	0.9(0.05)	0.87(0.05)	0.89(0.03)
LassoJoint_MM_lambda.min	0.71(0.09)	0.69(0.04)	0.86(0.02)	0.81(0.03)	0.9(0.03)
Naive	0(0)	0(0)	0.08(0.01)	0.58(0.01)	0.84(0.05)
Oracle	0.91(0)	0.91(0.01)	0.91(0)	0.91(0.01)	0.91(0.03)
Weighted BFGS	0.92(0.01)	0.72(0.02)	0.91(0.04)	0.83(0.14)	0.51(0.38)

Table 45. Recall score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.45(0.03)	0.71(0.03)	0.79(0.03)	0.84(0.02)	0.9(0.01)
AdaS_svm	0.4(0.06)	0.68(0.03)	0.78(0.02)	0.86(0.02)	0.93(0)
Joint BFGS	0.84(0.01)	0.91(0.02)	0.75(0.34)	0.01(0.01)	0.02(0.13)
Joint MM	0.42(0.05)	0.79(0.03)	0.89(0.01)	0.93(0.01)	0.94(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	0.07(0.2)	0.55(0.44)	0.2(0.39)	0.56(0.4)
LassoJoint_BFGS_lambda.1se	0.16(0.19)	0.91(0.06)	0.83(0.23)	0.03(0.09)	0.75(0.23)
LassoJoint_BFGS_lambda.min	0.75(0.06)	0.91(0.02)	0.91(0.09)	0.02(0.05)	0.48(0.41)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.09(0.2)	0.85(0.1)	0.92(0.02)	0.94(0.01)
LassoJoint_MM_lambda.1se	0.23(0.19)	0.79(0.06)	0.89(0.01)	0.93(0.01)	0.95(0.01)
LassoJoint_MM_lambda.min	0.37(0.07)	0.77(0.04)	0.88(0.01)	0.93(0.01)	0.94(0.01)
Naive	0(0)	0.02(0.01)	0.28(0.03)	0.85(0.01)	0.92(0.01)
Oracle	0.95(0.01)	0.95(0.01)	0.95(0.01)	0.95(0)	0.95(0)
Weighted BFGS	0.81(0.01)	0.9(0.02)	0.74(0.31)	0.08(0.02)	0.12(0.11)

Table 46. Recall score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.65(0.17)	0.8(0.05)	0.76(0.05)	0.9(0.01)	0.85(0.01)
AdaS_svm	0.44(0.26)	0.66(0.11)	0.72(0.07)	0.9(0.01)	0.89(0.01)
Joint BFGS	0.51(0.05)	0.36(0.16)	0.73(0.07)	0.88(0.02)	0.87(0.02)
Joint MM	0.23(0.08)	0.33(0.09)	0.73(0.07)	0.86(0.01)	0.85(0.03)
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	0.13(0.32)	0.91(0.05)	0.85(0.26)	0.92(0.04)
LassoJoint_BFGS_lambda.1se	0.79(0.33)	0.45(0.35)	0.85(0.05)	0.91(0.02)	0.89(0.02)
LassoJoint_BFGS_lambda.min	0.66(0.11)	0.44(0.27)	0.83(0.05)	0.94(0.02)	0.9(0.04)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.95(0.03)	0.9(0.06)	0.93(0.04)	0.92(0.04)
LassoJoint_MM_lambda.1se	0.24(0.34)	0.76(0.14)	0.84(0.05)	0.94(0.02)	0.9(0.02)
LassoJoint_MM_lambda.min	0.43(0.13)	0.34(0.15)	0.8(0.04)	0.89(0.02)	0.9(0.02)
Naive	0.03(0.02)	0.17(0.05)	0.43(0.08)	0.64(0.01)	0.82(0.03)
Oracle	0.95(0.05)	0.95(0.04)	0.95(0.05)	0.95(0.01)	0.95(0.03)
Weighted BFGS	0.48(0.04)	0.38(0.18)	0.72(0.07)	0.83(0)	0.81(0.03)

Table 47. Recall score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.59(0.03)	0.78(0.03)	0.77(0.09)	0.94(0.02)	0.97(0.02)
AdaS_svm	0.73(0.02)	0.78(0.03)	0.72(0.06)	0.9(0.04)	0.99(0.01)
Joint BFGS	0.03(0.07)	0.83(0.01)	0.53(0.38)	0.02(0.04)	0.24(0.13)
Joint MM	0.02(0.03)	0.7(0.02)	0.73(0.05)	0.91(0.04)	0.96(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.91(0.03)	0.95(0.05)	0.96(0.02)	0.49(0.46)
LassoJoint_BFGS_lambda.1se	0(0)	0.96(0.03)	0.89(0.07)	0.75(0.31)	0.23(0.26)
LassoJoint_BFGS_lambda.min	0.66(0.06)	0.85(0.18)	0.84(0.05)	0.53(0.36)	0.18(0.14)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.86(0.05)	0.92(0.05)	0.94(0.03)	0.97(0.02)
LassoJoint_MM_lambda.1se	0(0)	0.89(0.03)	0.82(0.07)	0.95(0.02)	0.98(0.01)
LassoJoint_MM_lambda.min	0.15(0.11)	0.81(0.15)	0.78(0.05)	0.92(0.04)	0.98(0.01)
Naive	0.04(0)	0.07(0.01)	0.3(0.04)	0.83(0.02)	0.96(0.01)
Oracle	1(0)	1(0.01)	1(0.01)	1(0.02)	1(0.01)
Weighted BFGS	0.02(0.06)	0.75(0.02)	0.51(0.36)	0.15(0.06)	0.63(0.07)

Table 48. Precision score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	1(0)	1(0)	1(0)	1(0)	1(0)
AdaS_svm	1(0)	1(0)	1(0)	1(0)	1(0)
Joint BFGS	0.99(0.01)	0.99(0)	1(0)	0.99(0)	0.99(0.01)
Joint MM	1(0)	1(0)	1(0)	1(0)	1(0)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.56(0.09)	0.9(0.03)	0.99(0.02)	0.99(0.01)	0.99(0.01)
LassoJoint_BFGS_lambda.1se	0.65(0.15)	0.99(0.01)	1(0)	0.99(0)	0.99(0.01)
LassoJoint_BFGS_lambda.min	0.99(0.01)	0.99(0)	1(0)	0.99(0)	0.99(0.01)
LassoJoint_MM_(log(p)/n)^(1/2)	0.96(0.03)	0.92(0.02)	1(0.02)	1(0)	1(0)
LassoJoint_MM_lambda.1se	0.97(0.02)	1(0.01)	1(0)	1(0)	1(0)
LassoJoint_MM_lambda.min	1(0)	1(0)	1(0)	1(0)	1(0)
Naive	NaN(NA)	1(NA)	1(0)	1(0)	1(0)
Oracle	1(0)	1(0)	1(0)	1(0)	1(0.01)
Weighted BFGS	0.96(0.03)	0.95(0.01)	0.98(0)	0.99(0)	0.99(0.01)

Table 49. Precision score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.88(0.05)	0.94(0)	1(0.01)	0.95(0.04)	0.9(0.02)
AdaS_svm	1(0)	1(0)	1(0)	0.98(0.03)	0.92(0.02)
Joint BFGS	0.96(0.05)	1(0.01)	1(0.01)	0.92(0.02)	0.91(0)
Joint MM	0.96(0.02)	1(0)	1(0.01)	0.93(0.03)	0.91(0)
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.89(0.06)	0.99(0.01)	0.95(0.04)	0.94(0.04)
LassoJoint_BFGS_lambda.1se	0.91(0.03)	0.97(0.04)	0.99(0.01)	0.93(0.03)	0.92(0.03)
LassoJoint_BFGS_lambda.min	0.93(0.04)	0.97(0.04)	1(0.01)	0.92(0.03)	0.92(0.01)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.94(0.04)	1(0.01)	0.96(0.04)	0.95(0.03)
LassoJoint_MM_lambda.1se	0.95(0.03)	0.99(0.02)	1(0)	0.94(0.03)	0.93(0.02)
LassoJoint_MM_lambda.min	0.98(0.02)	0.99(0.02)	1(0)	0.94(0.03)	0.92(0.02)
Naive	1(0)	NaN(NA)	1(0)	1(0)	0.96(0.03)
Oracle	0.97(0.04)	0.97(0.01)	0.97(0.02)	0.97(0.03)	0.97(0.01)
Weighted BFGS	0.84(0.02)	0.95(0)	0.99(0.02)	0.93(0.02)	0.92(0.03)

Table 50. Precision score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.89(0)	0.83(0.01)	0.82(0.02)	0.83(0.04)	0.84(0.03)
AdaS_svm	0.73(0.02)	0.89(0.01)	0.94(0.01)	0.96(0.01)	0.93(0.01)
Joint BFGS	NaN(NA)	0.02(0.13)	0.84(0.1)	0.82(0.03)	0.99(0.01)
Joint MM	0.84(0)	0.84(0.02)	0.85(0.04)	0.86(0.03)	0.91(0.03)
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.95(0.03)	0.94(0.03)	0.94(0.03)	0.94(0.03)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.92(0.01)	0.94(0.02)	0.88(0.03)	0.91(0.06)
LassoJoint_BFGS_lambda.min	0.78(0.02)	0.91(0.03)	0.9(0.07)	0.86(0.04)	0.97(0.02)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.95(0.03)	0.94(0.03)	0.94(0.03)	0.94(0.03)
LassoJoint_MM_lambda.1se	NaN(NA)	0.91(0.02)	0.93(0.02)	0.9(0.02)	0.95(0.02)
LassoJoint_MM_lambda.min	0.92(0.01)	0.92(0.01)	0.91(0.04)	0.91(0.02)	0.92(0.03)
Naive	1(NA)	0.89(0.02)	0.91(0.04)	0.95(0.03)	0.92(0.03)
Oracle	0.94(0)	0.94(0.01)	0.94(0.03)	0.94(0.02)	0.94(0.02)
Weighted BFGS	NaN(NA)	0.02(0.13)	0.88(0.11)	0.83(0.02)	0.97(0.02)

Table 51. Precision score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.78(0.03)	0.77(0.03)	0.77(0.05)	0.78(0)	0.82(0.03)
AdaS_svm	0.85(0.03)	0.86(0.03)	0.88(0.04)	0.85(0.01)	0.84(0.02)
Joint BFGS	0.76(0.02)	0.76(0.07)	0.75(0.05)	0.81(0.01)	0.83(0.02)
Joint MM	0.9(0.02)	0.82(0.04)	0.82(0.05)	0.83(0.01)	0.83(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.7(0.03)	0.71(0.03)	0.79(0.06)	0.81(0.05)	0.8(0.03)
LassoJoint_BFGS_lambda.1se	0.69(0.02)	0.7(0.02)	0.79(0.05)	0.92(0.09)	0.83(0.01)
LassoJoint_BFGS_lambda.min	0.79(0.09)	0.8(0.03)	0.82(0.05)	0.84(0.02)	0.83(0.01)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.86(0.05)	0.86(0.05)	0.82(0.04)	0.8(0.03)
LassoJoint_MM_lambda.1se	NaN(NA)	NaN(NA)	0.84(0.04)	0.82(0.02)	0.82(0.02)
LassoJoint_MM_lambda.min	0.91(0.05)	0.83(0.05)	0.82(0.04)	0.82(0.02)	0.83(0.01)
Naive	NaN(NA)	0.96(0.16)	0.92(0.04)	0.87(0.01)	0.83(0.01)
Oracle	0.82(0.03)	0.82(0.02)	0.82(0.03)	0.82(0)	0.82(0.01)
Weighted BFGS	0.82(0.03)	0.8(0.03)	0.78(0.04)	0.8(0)	0.83(0.01)

Table 52. Precision score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.63(0.04)	0.74(0.05)	0.75(0.04)	0.79(0.03)	0.79(0.01)
AdaS_svm	0.3(0.11)	0.72(0.08)	0.9(0.06)	0.94(0.02)	0.89(0.01)
Joint BFGS	0.85(0.1)	0.98(0.03)	0.96(0.04)	0.96(0.02)	0.91(0.01)
Joint MM	0.64(0.07)	0.77(0.09)	0.83(0.06)	0.79(0.03)	0.87(0.02)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.64(0.05)	0.58(0.09)	0.82(0.06)	0.78(0.05)	0.87(0.07)
LassoJoint_BFGS_lambda.1se	0.59(0.01)	0.8(0.12)	0.91(0.02)	0.94(0.01)	0.97(0.01)
LassoJoint_BFGS_lambda.min	0.83(0.03)	0.95(0.05)	0.92(0.05)	0.95(0.04)	0.92(0.01)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	NaN(NA)	0.83(0.06)	0.78(0.05)	0.87(0.06)
LassoJoint_MM_lambda.1se	NaN(NA)	0.86(0.08)	0.91(0.02)	0.93(0.01)	0.95(0)
LassoJoint_MM_lambda.min	0.99(0.06)	0.94(0.05)	0.93(0.03)	0.93(0.02)	0.94(0)
Naive	0.85(0.09)	0.98(0.03)	0.96(0.05)	0.92(0.01)	0.91(0)
Oracle	0.95(0.02)	0.95(0.04)	0.95(0.03)	0.95(0.02)	0.95(0.01)
Weighted BFGS	0.88(0.08)	0.98(0.03)	0.93(0.05)	0.91(0.02)	0.89(0.01)

Table 53. Precision score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.66(0.01)	0.87(0.01)	0.91(0.02)	0.82(0.01)	0.79(0.02)
AdaS_svm	0.63(0.34)	0.92(0.01)	0.92(0.01)	0.82(0.02)	0.81(0.02)
Joint BFGS	0.77(0.03)	0.84(0.01)	0.8(0.01)	0.79(0.03)	0.9(0.11)
Joint MM	0.8(0.01)	0.84(0.01)	0.82(0)	0.79(0.03)	0.76(0.03)
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.76(0.04)	0.79(0.05)	0.81(0.1)	0.97(0.07)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.79(0.03)	0.77(0.02)	0.74(0.03)	0.74(0.05)
LassoJoint_BFGS_lambda.min	0.75(0.03)	0.81(0.02)	0.82(0.02)	0.79(0.03)	0.94(0.09)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.78(0.04)	0.8(0.05)	0.82(0.04)	0.79(0.04)
LassoJoint_MM_lambda.1se	NaN(NA)	0.81(0.01)	0.79(0.02)	0.75(0.04)	0.75(0.04)
LassoJoint_MM_lambda.min	0.81(0.03)	0.83(0.02)	0.83(0.02)	0.8(0.02)	0.77(0.03)
Naive	NaN(NA)	1(0)	1(0.01)	0.86(0.01)	0.8(0.02)
Oracle	0.82(0.01)	0.82(0.01)	0.82(0.01)	0.82(0.01)	0.82(0.03)
Weighted BFGS	0.73(0.01)	0.83(0.01)	0.81(0.01)	0.79(0.04)	0.87(0.1)

Table 54. Precision score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.84(0.03)	0.88(0.02)	0.9(0.01)	0.92(0.01)	0.89(0.01)
AdaS_svm	0.92(0.04)	0.95(0.01)	0.95(0.01)	0.97(0)	0.95(0)
Joint BFGS	0.88(0.02)	0.92(0.01)	0.94(0.04)	1(0)	1(0.01)
Joint MM	0.93(0.01)	0.95(0.01)	0.93(0.01)	0.96(0)	0.92(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.61(0.01)	0.96(0.03)	0.92(0.04)	0.95(0.05)	0.94(0.04)
LassoJoint_BFGS_lambda.1se	0.91(0.11)	0.91(0.01)	0.92(0.02)	1(0.02)	0.94(0.02)
LassoJoint_BFGS_lambda.min	0.91(0.02)	0.91(0.01)	0.92(0.01)	0.99(0.02)	0.96(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.97(0.03)	0.92(0.02)	0.9(0.01)	0.91(0.01)
LassoJoint_MM_lambda.1se	0.9(0.06)	0.95(0.01)	0.93(0.01)	0.94(0.01)	0.92(0.01)
LassoJoint_MM_lambda.min	0.93(0.01)	0.95(0.01)	0.94(0.01)	0.95(0.01)	0.92(0.01)
Naive	0.76(0.43)	1(0)	0.99(0.01)	0.97(0.01)	0.92(0)
Oracle	0.94(0.01)	0.94(0.01)	0.94(0.01)	0.94(0)	0.94(0.01)
Weighted BFGS	0.85(0.02)	0.9(0.01)	0.92(0.04)	0.99(0.01)	0.98(0.01)

Table 55. Precision score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.96(0.02)	0.99(0.01)	1(0)	0.97(0)	0.97(0.01)
AdaS_svm	0.87(0.32)	1(0)	1(0)	1(0)	0.98(0.01)
Joint BFGS	0.95(0.04)	0.96(0.04)	0.91(0.03)	0.88(0.01)	0.98(0.01)
Joint MM	0.93(0.09)	0.96(0.03)	0.95(0.02)	0.97(0)	0.98(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.68(0.07)	0.99(0.02)	0.97(0.03)	0.98(0.02)	0.98(0.02)
LassoJoint_BFGS_lambda.1se	0.72(0.14)	0.99(0.01)	0.97(0.05)	0.99(0.01)	0.98(0.01)
LassoJoint_BFGS_lambda.min	0.97(0.04)	0.98(0.02)	0.93(0.03)	0.97(0.01)	0.97(0.02)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.98(0.02)	0.98(0.02)	0.98(0.02)	0.98(0.02)
LassoJoint_MM_lambda.1se	0.99(0.01)	0.99(0.01)	0.98(0.02)	0.98(0.01)	0.97(0.01)
LassoJoint_MM_lambda.min	0.99(0.02)	0.99(0.02)	0.97(0.02)	0.97(0.01)	0.99(0.01)
Naive	0.74(0.35)	1(0.01)	0.98(0.03)	1(0)	0.98(0.02)
Oracle	1(0.03)	1(0.02)	1(0.02)	1(0)	1(0.01)
Weighted BFGS	0.94(0.04)	0.92(0.07)	0.86(0.03)	0.97(0)	0.99(0.01)

Table 56. Precision score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.93(0.01)	0.96(0.01)	0.98(0.03)	0.97(0.01)	0.99(0.01)
AdaS_svm	0.96(0)	1(0.01)	1(0)	0.99(0.01)	0.99(0.01)
Joint BFGS	0.67(0.03)	0.95(0)	0.98(0.03)	1(0.01)	1(0)
Joint MM	0.5(0.05)	0.91(0.01)	0.99(0.02)	0.99(0.01)	0.97(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.96(0.03)	0.94(0.03)	0.94(0.03)	0.97(0.03)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.92(0.02)	0.98(0.01)	0.98(0.02)	0.99(0.01)
LassoJoint_BFGS_lambda.min	0.91(0.02)	0.96(0.01)	0.96(0.03)	0.99(0.02)	1(0.01)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.98(0.02)	0.96(0.02)	0.97(0.02)	0.96(0.02)
LassoJoint_MM_lambda.1se	NaN(NA)	0.98(0.01)	0.99(0.01)	0.98(0.02)	0.98(0.01)
LassoJoint_MM_lambda.min	0.88(0.08)	0.97(0.01)	0.98(0.02)	0.99(0.01)	0.97(0.01)
Naive	0.75(0.03)	0.85(0.04)	0.98(0.02)	0.99(0.01)	0.98(0.02)
Oracle	0.99(0.01)	0.99(0.01)	0.99(0.02)	0.99(0.02)	0.99(0.02)
Weighted BFGS	0.5(0.04)	0.93(0.01)	0.97(0.01)	0.99(0.02)	1(0)

Table 57. F1 score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.86(0.04)	0.82(0.07)	0.94(0.01)	0.98(0.01)	0.99(0)
AdaS_svm	0.9(0.03)	0.89(0.02)	0.98(0)	0.99(0.01)	1(0)
Joint BFGS	1(0)	1(0)	0.99(0)	1(0)	0.99(0)
Joint MM	0.98(0)	0.98(0)	0.98(0)	0.99(0)	0.99(0)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.71(0.05)	0.88(0.03)	0.99(0.02)	0.99(0)	0.98(0.05)
LassoJoint_BFGS_lambda.1se	0.75(0.08)	0.99(0.01)	0.99(0)	1(0)	0.99(0.02)
LassoJoint_BFGS_lambda.min	0.99(0.01)	1(0)	0.99(0)	1(0)	0.99(0.02)
LassoJoint_MM_(log(p)/n)^(1/2)	0.81(0.02)	0.86(0.02)	0.99(0.02)	0.99(0.01)	1(0)
LassoJoint_MM_lambda.1se	0.7(0.15)	0.98(0.02)	0.98(0)	0.99(0)	1(0)
LassoJoint_MM_lambda.min	0.98(0.01)	0.98(0)	0.98(0)	0.99(0)	1(0)
Naive	NaN(NA)	0.01(NA)	0.57(0.01)	0.94(0.01)	0.99(0)
Oracle	1(0)	1(0)	1(0)	1(0)	1(0)
Weighted BFGS	0.97(0.03)	0.96(0.01)	0.97(0)	0.99(0)	0.99(0)

Table 58. F1 score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.67(0.13)	0.84(0.01)	0.96(0.02)	0.95(0.02)	0.89(0.03)
AdaS_svm	0.77(0.12)	0.86(0.02)	0.88(0.02)	0.94(0.02)	0.89(0.04)
Joint BFGS	0.89(0.03)	0.9(0.03)	0.98(0.01)	0.94(0.01)	0.88(0.02)
Joint MM	0.83(0.05)	0.82(0.06)	0.97(0.02)	0.94(0.01)	0.89(0.03)
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.9(0.04)	0.87(0.08)	0.95(0.03)	0.94(0.02)
LassoJoint_BFGS_lambda.1se	0.71(0.15)	0.91(0.03)	0.93(0.07)	0.94(0.01)	0.8(0.15)
LassoJoint_BFGS_lambda.min	0.88(0.06)	0.92(0.02)	0.94(0.07)	0.94(0.02)	0.86(0.1)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.91(0.04)	0.86(0.11)	0.95(0.02)	0.94(0.02)
LassoJoint_MM_lambda.1se	0.69(0.15)	0.9(0.02)	0.93(0.04)	0.94(0.01)	0.9(0.02)
LassoJoint_MM_lambda.min	0.86(0.05)	0.87(0.04)	0.93(0.05)	0.94(0.01)	0.9(0.03)
Naive	0.05(0)	NaN(NA)	0.59(0.07)	0.94(0.02)	0.9(0.02)
Oracle	0.96(0.03)	0.96(0)	0.96(0.01)	0.96(0.01)	0.96(0.03)
Weighted BFGS	0.77(0.03)	0.89(0.04)	0.96(0.03)	0.94(0.01)	0.89(0.01)

Table 59. F1 score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.49(0.02)	0.73(0.01)	0.78(0.04)	0.76(0.03)	0.86(0.03)
AdaS_svm	0.26(0.02)	0.75(0.01)	0.84(0.04)	0.86(0.02)	0.88(0.02)
Joint BFGS	NaN(NA)	0.8(0.04)	0.67(0.26)	0.84(0.01)	0.36(0.34)
Joint MM	0.36(0)	0.26(0.11)	0.83(0.04)	0.84(0.01)	0.91(0.02)
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.88(0.04)	0.86(0.02)	0.86(0.03)	0.86(0.03)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.7(0.15)	0.65(0.15)	0.86(0.02)	0.8(0.09)
LassoJoint_BFGS_lambda.min	0.74(0.13)	0.72(0.11)	0.71(0.25)	0.84(0.05)	0.7(0.08)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.87(0.03)	0.86(0.02)	0.86(0.03)	0.86(0.03)
LassoJoint_MM_lambda.1se	NaN(NA)	0.75(0.07)	0.87(0.02)	0.85(0.02)	0.89(0.03)
LassoJoint_MM_lambda.min	0.47(0.13)	0.76(0.04)	0.86(0.03)	0.86(0.02)	0.89(0.02)
Naive	0.03(NA)	0.2(0.02)	0.51(0.07)	0.67(0.07)	0.9(0.02)
Oracle	0.93(0)	0.93(0.01)	0.93(0.03)	0.93(0.04)	0.93(0.02)
Weighted BFGS	NaN(NA)	0.78(0.07)	0.52(0.36)	0.84(0.01)	0.61(0.1)

Table 60. F1 score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.65(0.07)	0.56(0.04)	0.63(0.04)	0.66(0)	0.72(0.02)
AdaS_svm	0.48(0.16)	0.52(0.08)	0.61(0.04)	0.71(0)	0.73(0.04)
Joint BFGS	0.7(0.03)	0.76(0.03)	0.81(0.03)	0.79(0)	0.79(0.03)
Joint MM	0.6(0.06)	0.73(0.04)	0.77(0.07)	0.73(0.01)	0.81(0.02)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.82(0.02)	0.83(0.02)	0.75(0.06)	0.73(0.12)	0.81(0.04)
LassoJoint_BFGS_lambda.1se	0.82(0.01)	0.75(0.11)	0.66(0.13)	0.33(0.21)	0.8(0.02)
LassoJoint_BFGS_lambda.min	0.58(0.1)	0.67(0.12)	0.73(0.15)	0.7(0.05)	0.79(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.64(0.04)	0.69(0.05)	0.74(0.06)	0.82(0.02)
LassoJoint_MM_lambda.1se	NaN(NA)	NaN(NA)	0.7(0.05)	0.69(0.04)	0.82(0.02)
LassoJoint_MM_lambda.min	0.23(0.2)	0.64(0.18)	0.75(0.06)	0.71(0.04)	0.82(0.02)
Naive	NaN(NA)	0.03(0.02)	0.33(0.06)	0.71(0.02)	0.81(0.02)
Oracle	0.86(0.02)	0.86(0.02)	0.86(0.02)	0.86(0)	0.86(0.01)
Weighted BFGS	0.74(0.04)	0.79(0.03)	0.81(0.03)	0.77(0.01)	0.81(0.02)

Table 61. F1 score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.67(0.07)	0.62(0.07)	0.76(0.07)	0.81(0.03)	0.83(0.01)
AdaS_svm	0.09(0.05)	0.65(0.15)	0.72(0.11)	0.85(0.04)	0.81(0.01)
Joint BFGS	0.32(0.13)	0.38(0.14)	0.58(0.23)	0.79(0.04)	0.82(0.01)
Joint MM	0.41(0.04)	0.53(0.08)	0.65(0.07)	0.71(0.06)	0.72(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.78(0.04)	0.73(0.07)	0.75(0.1)	0.83(0.02)	0.88(0.03)
LassoJoint_BFGS_lambda.1se	0.73(0.04)	0.78(0.07)	0.8(0.13)	0.93(0.02)	0.92(0.01)
LassoJoint_BFGS_lambda.min	0.5(0.11)	0.45(0.33)	0.73(0.18)	0.8(0.07)	0.83(0.01)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	NaN(NA)	0.74(0.1)	0.83(0.03)	0.89(0.03)
LassoJoint_MM_lambda.1se	NaN(NA)	0.73(0.07)	0.85(0.02)	0.93(0.01)	0.89(0)
LassoJoint_MM_lambda.min	0.28(0.11)	0.49(0.21)	0.79(0.06)	0.87(0.07)	0.81(0.02)
Naive	0.29(0.05)	0.41(0.05)	0.65(0.06)	0.76(0.02)	0.8(0.01)
Oracle	0.95(0.02)	0.95(0.03)	0.95(0.02)	0.95(0.03)	0.95(0.01)
Weighted BFGS	0.34(0.08)	0.49(0.12)	0.67(0.1)	0.73(0.02)	0.81(0.02)

Table 62. F1 score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.56(0.03)	0.71(0.01)	0.73(0.01)	0.75(0.01)	0.77(0.03)
AdaS_svm	0.29(0.26)	0.66(0.02)	0.69(0)	0.74(0.02)	0.75(0.03)
Joint BFGS	0.82(0.01)	0.77(0.01)	0.85(0.02)	0.78(0.11)	0.44(0.37)
Joint MM	0.79(0.01)	0.76(0.01)	0.85(0.01)	0.8(0.02)	0.83(0.02)
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.81(0.03)	0.83(0.03)	0.6(0.34)	0.12(0.28)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.58(0.1)	0.84(0.01)	0.76(0.09)	0.69(0.13)
LassoJoint_BFGS_lambda.min	0.77(0.08)	0.77(0.02)	0.85(0.02)	0.74(0.12)	0.22(0.31)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.8(0.03)	0.83(0.03)	0.81(0.03)	0.83(0.03)
LassoJoint_MM_lambda.1se	NaN(NA)	0.66(0.13)	0.84(0.03)	0.8(0.01)	0.82(0.02)
LassoJoint_MM_lambda.min	0.75(0.05)	0.75(0.02)	0.84(0.01)	0.8(0.01)	0.83(0.02)
Naive	NaN(NA)	0.02(0.01)	0.15(0.02)	0.69(0.01)	0.82(0.03)
Oracle	0.86(0.01)	0.86(0.01)	0.86(0.01)	0.86(0.01)	0.86(0.01)
Weighted BFGS	0.81(0.01)	0.77(0.01)	0.86(0.02)	0.79(0.11)	0.53(0.31)

Table 63. F1 score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.59(0.03)	0.79(0.02)	0.84(0.02)	0.88(0.01)	0.9(0)
AdaS_svm	0.55(0.05)	0.79(0.02)	0.86(0.01)	0.91(0.01)	0.94(0)
Joint BFGS	0.86(0.01)	0.91(0.01)	0.76(0.31)	0.03(0.01)	0.04(0.18)
Joint MM	0.58(0.05)	0.86(0.02)	0.91(0.01)	0.94(0)	0.93(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.76(0.01)	0.53(0.35)	0.79(0.3)	0.51(0.46)	0.73(0.31)
LassoJoint_BFGS_lambda.1se	0.38(0.24)	0.91(0.04)	0.85(0.19)	0.06(0.13)	0.81(0.18)
LassoJoint_BFGS_lambda.min	0.82(0.03)	0.91(0.01)	0.91(0.06)	0.03(0.07)	0.53(0.41)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.51(0.27)	0.88(0.07)	0.91(0.01)	0.92(0.01)
LassoJoint_MM_lambda.1se	0.4(0.21)	0.86(0.04)	0.91(0.01)	0.94(0.01)	0.93(0.01)
LassoJoint_MM_lambda.min	0.53(0.07)	0.85(0.02)	0.91(0.01)	0.94(0.01)	0.93(0.01)
Naive	0.01(0)	0.03(0.01)	0.44(0.03)	0.91(0)	0.92(0)
Oracle	0.95(0.01)	0.95(0)	0.95(0)	0.95(0)	0.95(0.01)
Weighted BFGS	0.83(0.01)	0.9(0.01)	0.76(0.26)	0.14(0.03)	0.21(0.1)

Table 64. F1 score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.76(0.15)	0.89(0.03)	0.86(0.03)	0.94(0.01)	0.9(0.01)
AdaS_svm	0.63(0.23)	0.79(0.08)	0.83(0.05)	0.95(0.01)	0.93(0.01)
Joint BFGS	0.66(0.05)	0.5(0.18)	0.81(0.04)	0.88(0.01)	0.92(0.01)
Joint MM	0.36(0.12)	0.48(0.1)	0.83(0.05)	0.91(0.01)	0.91(0.02)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.81(0.05)	0.96(0.02)	0.94(0.03)	0.95(0.03)	0.95(0.02)
LassoJoint_BFGS_lambda.1se	0.78(0.1)	0.75(0.19)	0.9(0.03)	0.95(0.01)	0.93(0.01)
LassoJoint_BFGS_lambda.min	0.77(0.08)	0.55(0.29)	0.87(0.03)	0.96(0.01)	0.93(0.02)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.96(0.02)	0.93(0.03)	0.95(0.03)	0.95(0.02)
LassoJoint_MM_lambda.1se	0.74(0.17)	0.85(0.09)	0.9(0.03)	0.96(0.01)	0.94(0.01)
LassoJoint_MM_lambda.min	0.59(0.13)	0.48(0.16)	0.88(0.02)	0.93(0.01)	0.94(0.01)
Naive	0.07(0.02)	0.28(0.07)	0.6(0.08)	0.78(0)	0.89(0.02)
Oracle	0.97(0.02)	0.97(0.03)	0.97(0.02)	0.97(0)	0.97(0.02)
Weighted BFGS	0.63(0.03)	0.5(0.19)	0.78(0.05)	0.9(0)	0.89(0.01)

Table 65. F1 score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.72(0.03)	0.86(0.02)	0.86(0.06)	0.96(0.01)	0.98(0.01)
AdaS_svm	0.83(0.02)	0.88(0.02)	0.83(0.05)	0.94(0.02)	0.99(0.01)
Joint BFGS	0.06(0.07)	0.89(0.01)	0.86(0.11)	0.11(0.07)	0.37(0.16)
Joint MM	0.03(0.04)	0.79(0.01)	0.84(0.04)	0.95(0.02)	0.96(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.94(0.02)	0.94(0.02)	0.95(0.02)	0.77(0.35)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.94(0.01)	0.93(0.04)	0.8(0.26)	0.54(0.2)
LassoJoint_BFGS_lambda.min	0.76(0.04)	0.89(0.12)	0.89(0.04)	0.62(0.32)	0.4(0.1)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.92(0.03)	0.94(0.02)	0.95(0.02)	0.96(0.02)
LassoJoint_MM_lambda.1se	NaN(NA)	0.93(0.02)	0.9(0.04)	0.97(0.01)	0.98(0.01)
LassoJoint_MM_lambda.min	0.25(0.16)	0.88(0.1)	0.87(0.03)	0.95(0.02)	0.97(0.01)
Naive	0.08(0)	0.13(0.02)	0.46(0.04)	0.91(0.02)	0.97(0.01)
Oracle	0.97(0)	0.97(0)	0.97(0)	0.97(0.01)	0.97(0.01)
Weighted BFGS	0.03(0.07)	0.83(0.01)	0.83(0.13)	0.26(0.08)	0.77(0.05)

Table 66. Method avg.rank based on Accuracy metrics

method	0.1	0.3	0.5	0.7	0.9
Oracle	1.11	1.22	1.44	1.44	1.67
LassoJoint_MM_lambda.min	6.30	6.17	5.54	5.77	5.31
LassoJoint_BFGS_lambda.min	3.60	5.08	5.15	7.54	8.23
LassoJoint_BFGS_lambda.1se	7.50	4.42	5.46	6.31	6.62
LassoJoint_MM_lambda.1se	9.60	6.08	5.46	5.23	4.31
Joint MM	6.22	8.11	6.33	6.67	6.11
LassoJoint_BFGS_(log(p)/n)^(1/2)	7.90	6.17	5.69	6.15	7.92
AdaS_svm	7.11	8.67	8.58	5.00	5.00
AdaS_knn	5.00	8.44	7.17	6.67	7.25
LassoJoint_MM_(log(p)/n)^(1/2)	12.00	6.58	6.15	6.00	4.23
Joint BFGS	4.67	5.89	7.33	8.44	10.11
Weighted BFGS	6.56	7.67	8.44	9.56	11.00
Naive	10.56	12.00	12.44	10.22	7.22

Table 67. Method avg.rank based on Recall metrics

method	0.1	0.3	0.5	0.7	0.9
Oracle	1.78	1.56	1.33	1.44	1.33
LassoJoint_BFGS_(log(p)/n)^(1/2)	5.40	5.17	5.08	5.31	6.69
LassoJoint_BFGS_lambda.1se	6.70	4.33	5.00	5.92	7.31
LassoJoint_BFGS_lambda.min	3.90	5.08	5.23	7.00	8.31
LassoJoint_MM_lambda.min	6.60	6.75	6.38	5.85	6.00
AdaS_knn	5.56	7.44	6.58	6.92	5.75
LassoJoint_MM_lambda.1se	10.60	6.50	5.62	5.23	4.77
Joint MM	6.33	8.22	6.56	6.89	6.33
LassoJoint_MM_(log(p)/n)^(1/2)	11.10	6.33	6.54	6.46	4.31
Joint BFGS	5.11	6.44	6.78	6.44	10.11
AdaS_svm	7.33	9.33	8.75	7.58	5.58
Weighted BFGS	6.44	7.33	8.67	8.11	10.00
Naive	11.56	12.11	12.67	11.44	8.44

Table 68. Method avg.rank based on Precision metrics

method	0.1	0.3	0.5	0.7	0.9
AdaS_svm	5.22	3.56	3.25	2.92	4.67
Oracle	2.33	5.56	6.56	6.00	5.56
LassoJoint_MM_lambda.min	2.60	4.83	5.62	6.62	7.00
LassoJoint_BFGS_lambda.min	5.50	6.58	6.62	6.08	4.77
Naive	8.22	5.33	5.22	3.89	7.78
Joint BFGS	6.22	7.33	6.89	7.56	4.33
LassoJoint_MM_lambda.1se	8.80	5.83	5.38	6.77	6.46
Joint MM	4.89	7.11	6.33	7.22	8.22
AdaS_knn	6.22	7.44	5.83	6.83	8.33
LassoJoint_BFGS_lambda.1se	9.10	7.17	7.08	5.85	6.15
LassoJoint_BFGS_(log(p)/n)^(1/2)	9.80	7.67	8.15	7.23	6.38
LassoJoint_MM_(log(p)/n)^(1/2)	11.10	7.00	7.15	7.23	8.00
Weighted BFGS	8.11	9.56	10.44	10.22	6.11

Table 69. Method avg.rank based on F1 metrics

method	0.1	0.3	0.5	0.7	0.9
Oracle	1.11	1.22	1.33	1.44	2.00
LassoJoint_BFGS_(log(p)/n)^(1/2)	6.40	3.92	4.38	5.31	6.46
LassoJoint_BFGS_lambda.1se	7.20	4.58	5.15	6.23	7.00
LassoJoint_MM_lambda.1se	10.40	6.58	4.85	5.15	3.69
LassoJoint_BFGS_lambda.min	3.80	5.33	5.85	7.77	8.69
LassoJoint_MM_lambda.min	6.70	7.25	6.54	6.31	5.08
LassoJoint_MM_(log(p)/n)^(1/2)	11.10	6.58	6.77	5.69	4.38
Joint MM	6.33	8.67	6.44	6.56	6.56
AdaS_svm	7.22	8.44	8.42	4.92	5.58
Joint BFGS	4.67	5.22	6.89	7.89	10.56
AdaS_knn	5.89	8.89	7.00	7.00	6.92
Weighted BFGS	6.78	7.22	8.78	9.89	10.89
Naive	10.67	12.67	12.89	11.00	7.67

5 Results of the joint-wise methods for the high-dimensional datasets

Table 70. Accuracy score on 'Alon_DS' dataset

method	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.58(0.1)	0.67(0.1)	0.7(0.17)
LassoJoint_BFGS_lambda.1se	0.58(0.1)	0.58(0.1)	0.9(0.11)
LassoJoint_BFGS_lambda.min	0.48(0.11)	0.5(0.16)	0.92(0.06)
LassoJoint_MM_(log(p)/n)^(1/2)	0.42(0.1)	0.33(0.1)	0.57(0.27)
LassoJoint_MM_lambda.1se	0.5(0.1)	0.55(0.17)	0.88(0.11)
LassoJoint_MM_lambda.min	0.48(0.11)	0.67(0.16)	0.8(0.17)
MIF5 Joint BFGS	0.7(0.13)	0.6(0.22)	0.78(0.17)
MIF5 Joint MM	0.58(0.2)	0.68(0.25)	0.83(0.16)

Table 71. Accuracy score on 'lymphoma' dataset

method	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.72(0.1)	0.65(0.09)	0.63(0.16)
LassoJoint_BFGS_lambda.1se	0.73(0.09)	0.62(0.25)	0.97(0.05)
LassoJoint_BFGS_lambda.min	0.72(0.29)	0.7(0.15)	0.97(0.05)
LassoJoint_MM_(log(p)/n)^(1/2)	0.28(0.1)	0.35(0.09)	0.63(0.16)
LassoJoint_MM_lambda.1se	0.5(0.32)	0.63(0.19)	0.95(0.05)
LassoJoint_MM_lambda.min	0.63(0.27)	0.65(0.19)	0.88(0.07)
MIF5 Joint BFGS	0.83(0.08)	0.95(0.05)	0.92(0.08)
MIF5 Joint MM	0.83(0.1)	0.85(0.11)	0.92(0.08)

Table 72. Accuracy score on 'prostate' dataset

method	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.47(0.1)	0.5(0.09)	0.82(0.24)
LassoJoint_BFGS_lambda.1se	0.65(0.17)	0.73(0.06)	0.92(0.08)
LassoJoint_BFGS_lambda.min	0.65(0.05)	0.57(0.15)	0.75(0.12)
LassoJoint_MM_(log(p)/n)^(1/2)	0.55(0.09)	0.5(0.09)	0.91(0.1)
LassoJoint_MM_lambda.1se	0.6(0.12)	0.73(0.08)	0.89(0.05)
LassoJoint_MM_lambda.min	0.62(0.08)	0.75(0.05)	0.84(0.07)
MIF5 Joint BFGS	0.68(0.1)	0.82(0.06)	0.91(0.08)
MIF5 Joint MM	0.76(0.08)	0.9(0.04)	0.94(0.08)

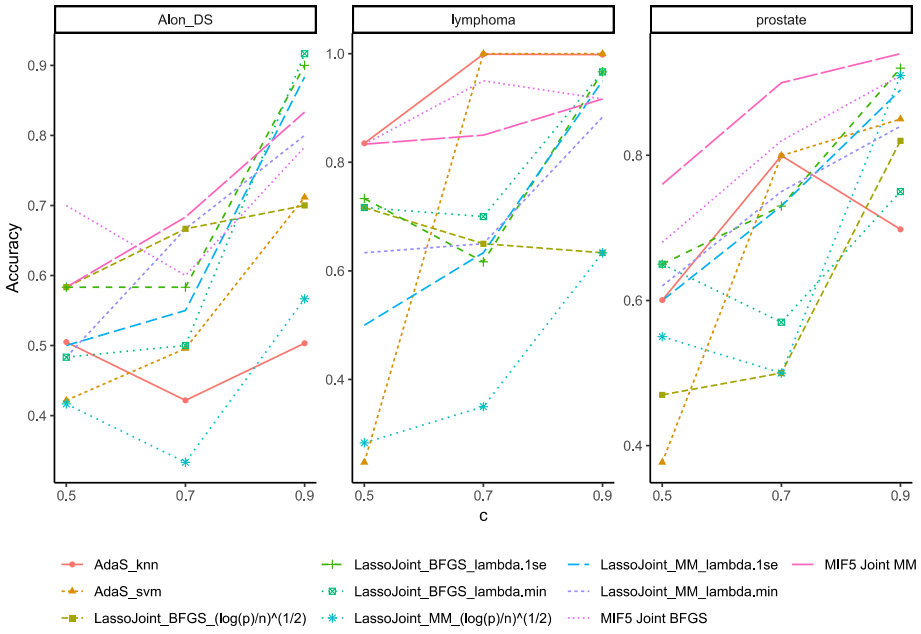

Fig. 3. The accuracy for the high-dimensional datasets

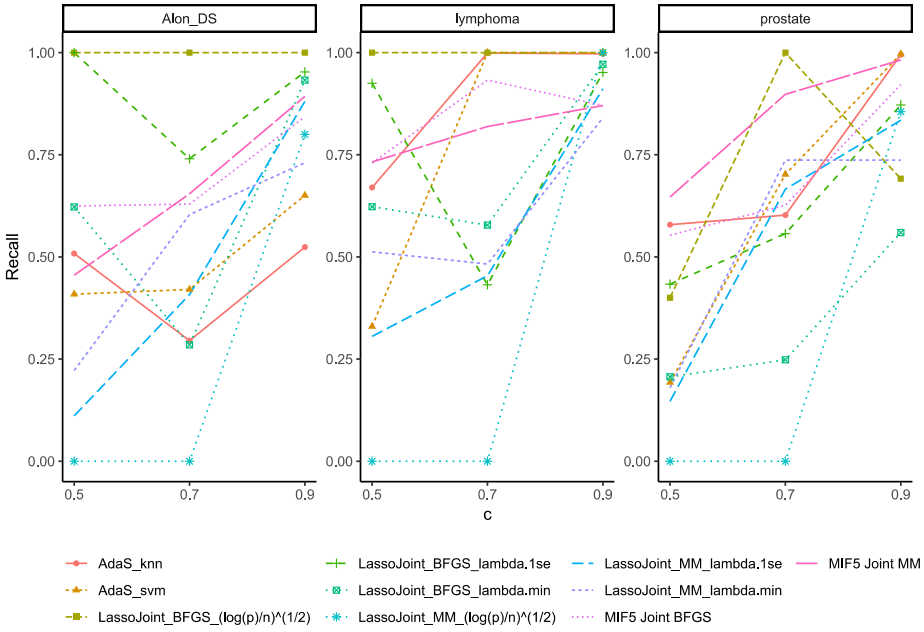

Fig. 4. The recall for the high-dimensional datasets

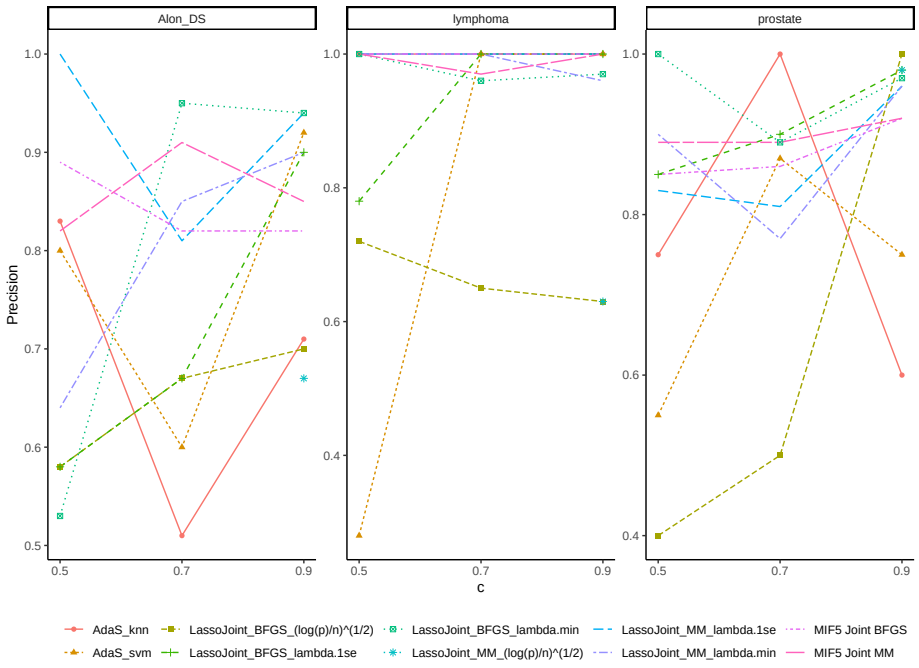

Fig. 5. The precision for the high-dimensional datasets

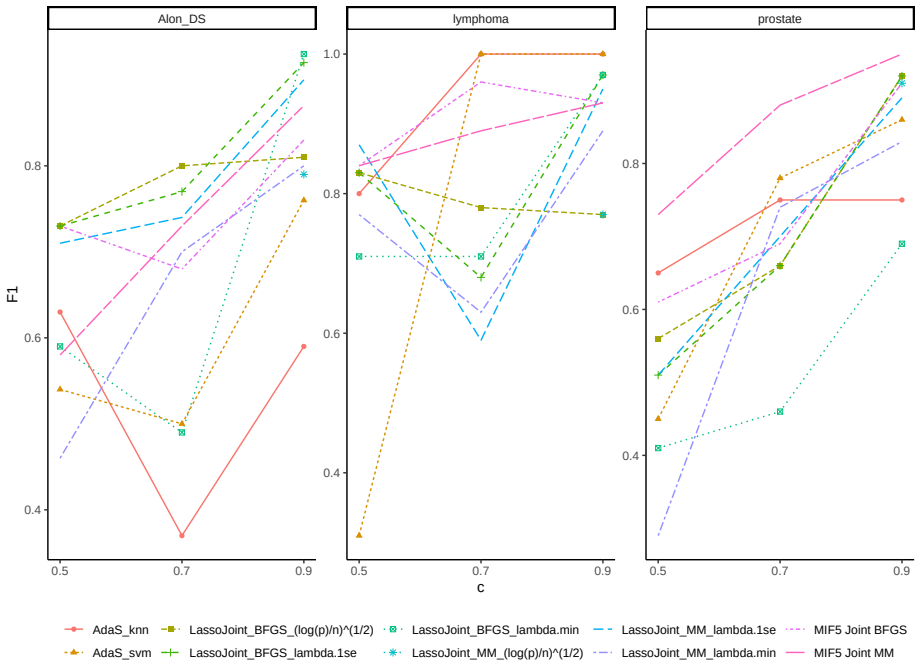

Fig. 6. The F1 score for the high-dimensional datasets

Table 73. Accuracy score on 'Alon_DS' dataset

method	0.5	0.7	0.9
AdaS_knn	0.5(0.03)	0.42(0.03)	0.5(0.03)
AdaS_svm	0.42(0.03)	0.5(0.02)	0.71(0.05)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.58(0.1)	0.67(0.1)	0.7(0.17)
LassoJoint_BFGS_lambda.1se	0.58(0.1)	0.58(0.1)	0.9(0.11)
LassoJoint_BFGS_lambda.min	0.48(0.11)	0.5(0.16)	0.92(0.06)
LassoJoint_MM_(log(p)/n)^(1/2)	0.42(0.1)	0.33(0.1)	0.57(0.27)
LassoJoint_MM_lambda.1se	0.5(0.1)	0.55(0.17)	0.88(0.11)
LassoJoint_MM_lambda.min	0.48(0.11)	0.67(0.16)	0.8(0.17)
MIF5 Joint BFGS	0.7(0.13)	0.6(0.22)	0.78(0.17)
MIF5 Joint MM	0.58(0.2)	0.68(0.25)	0.83(0.16)

Table 74. Accuracy score on 'lymphoma' dataset

method	0.5	0.7	0.9
AdaS_knn	0.84(0.02)	1(0.01)	1(0.01)
AdaS_svm	0.25(0.03)	1(0)	1(0)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.72(0.1)	0.65(0.09)	0.63(0.16)
LassoJoint_BFGS_lambda.1se	0.73(0.09)	0.62(0.25)	0.97(0.05)
LassoJoint_BFGS_lambda.min	0.72(0.29)	0.7(0.15)	0.97(0.05)
LassoJoint_MM_(log(p)/n)^(1/2)	0.28(0.1)	0.35(0.09)	0.63(0.16)
LassoJoint_MM_lambda.1se	0.5(0.32)	0.63(0.19)	0.95(0.05)
LassoJoint_MM_lambda.min	0.63(0.27)	0.65(0.19)	0.88(0.07)
MIF5 Joint BFGS	0.83(0.08)	0.95(0.05)	0.92(0.08)
MIF5 Joint MM	0.83(0.1)	0.85(0.11)	0.92(0.08)

Table 75. Accuracy score on 'prostate' dataset

method	0.5	0.7	0.9
AdaS_knn	0.6(0.01)	0.8(0.01)	0.7(0.02)
AdaS_svm	0.38(0.03)	0.8(0.01)	0.85(0.01)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.47(0.1)	0.5(0.09)	0.82(0.24)
LassoJoint_BFGS_lambda.1se	0.65(0.17)	0.73(0.06)	0.92(0.08)
LassoJoint_BFGS_lambda.min	0.65(0.05)	0.57(0.15)	0.75(0.12)
LassoJoint_MM_(log(p)/n)^(1/2)	0.55(0.09)	0.5(0.09)	0.91(0.1)
LassoJoint_MM_lambda.1se	0.6(0.12)	0.73(0.08)	0.89(0.05)
LassoJoint_MM_lambda.min	0.62(0.08)	0.75(0.05)	0.84(0.07)
MIF5 Joint BFGS	0.68(0.1)	0.82(0.06)	0.91(0.08)
MIF5 Joint MM	0.76(0.08)	0.9(0.04)	0.94(0.08)

Table 76. Recall score on 'Alon_DS' dataset

method	0.5	0.7	0.9
AdaS_knn	0.51(0.05)	0.3(0.07)	0.52(0.15)
AdaS_svm	0.41(0.06)	0.42(0.05)	0.65(0.04)
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	1(0)	1(0)
LassoJoint_BFGS_lambda.1se	1(0)	0.74(0.43)	0.95(0.06)
LassoJoint_BFGS_lambda.min	0.62(0.52)	0.28(0.23)	0.93(0.06)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0(0)	0.8(0.45)
LassoJoint_MM_lambda.1se	0.11(0.25)	0.41(0.37)	0.88(0.17)
LassoJoint_MM_lambda.min	0.22(0.24)	0.6(0.19)	0.73(0.24)
MIF5 Joint BFGS	0.62(0.13)	0.63(0.27)	0.84(0.14)
MIF5 Joint MM	0.46(0.2)	0.65(0.28)	0.89(0.15)

Table 77. Recall score on 'lymphoma' dataset

method	0.5	0.7	0.9
AdaS_knn	0.67(0.03)	1(0.01)	1(0.02)
AdaS_svm	0.33(0.03)	1(0)	1(0)
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	1(0)	1(0)
LassoJoint_BFGS_lambda.1se	0.92(0.17)	0.43(0.32)	0.95(0.07)
LassoJoint_BFGS_lambda.min	0.62(0.37)	0.58(0.19)	0.97(0.06)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0(0)	1(0)
LassoJoint_MM_lambda.1se	0.31(0.42)	0.45(0.24)	0.91(0.09)
LassoJoint_MM_lambda.min	0.51(0.34)	0.48(0.22)	0.84(0.11)
MIF5 Joint BFGS	0.73(0.11)	0.93(0.06)	0.87(0.13)
MIF5 Joint MM	0.73(0.12)	0.82(0.11)	0.87(0.13)

Table 78. Recall score on 'prostate' dataset

method	0.5	0.7	0.9
AdaS_knn	0.58(0.04)	0.6(0.02)	1(0.04)
AdaS_svm	0.19(0.19)	0.7(0.02)	1(0.04)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.4(0.55)	1(0)	0.69(0.4)
LassoJoint_BFGS_lambda.1se	0.43(0.48)	0.56(0.14)	0.87(0.11)
LassoJoint_BFGS_lambda.min	0.21(0.13)	0.25(0.36)	0.56(0.19)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0(0)	0.86(0.13)
LassoJoint_MM_lambda.1se	0.15(0.2)	0.67(0.2)	0.83(0.07)
LassoJoint_MM_lambda.min	0.18(0.1)	0.74(0.17)	0.74(0.14)
MIF5 Joint BFGS	0.55(0.3)	0.63(0.32)	0.92(0.13)
MIF5 Joint MM	0.65(0.19)	0.9(0.12)	0.98(0.04)

Table 79. F1 score on 'Alon_DS' dataset

method	0.5	0.7	0.9
AdaS_knn	0.63(0.02)	0.37(0.05)	0.59(0.09)
AdaS_svm	0.54(0.02)	0.5(0.03)	0.76(0.05)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.73(0.08)	0.8(0.07)	0.81(0.13)
LassoJoint_BFGS_lambda.1se	0.73(0.08)	0.77(0.04)	0.92(0.1)
LassoJoint_BFGS_lambda.min	0.59(0.26)	0.49(0.2)	0.93(0.06)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	NaN(NA)	0.79(0.14)
LassoJoint_MM_lambda.1se	0.71(NA)	0.74(0.03)	0.9(0.1)
LassoJoint_MM_lambda.min	0.46(0.19)	0.7(0.15)	0.8(0.2)
MIF5 Joint BFGS	0.73(0.14)	0.68(0.2)	0.83(0.14)
MIF5 Joint MM	0.58(0.24)	0.73(0.22)	0.87(0.13)

Table 80. F1 score on 'lymphoma' dataset

method	0.5	0.7	0.9
AdaS_knn	0.8(0.02)	1(0.01)	1(0.01)
AdaS_svm	0.31(0)	1(0)	1(0)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.83(0.07)	0.78(0.07)	0.77(0.12)
LassoJoint_BFGS_lambda.1se	0.83(0.07)	0.68(0.2)	0.97(0.04)
LassoJoint_BFGS_lambda.min	0.71(0.33)	0.71(0.15)	0.97(0.05)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	NaN(NA)	0.77(0.12)
LassoJoint_MM_lambda.1se	0.87(0.01)	0.59(0.22)	0.95(0.05)
LassoJoint_MM_lambda.min	0.77(0.16)	0.63(0.21)	0.89(0.08)
MIF5 Joint BFGS	0.84(0.07)	0.96(0.03)	0.93(0.08)
MIF5 Joint MM	0.84(0.09)	0.89(0.09)	0.93(0.08)

Table 81. F1 score on 'prostate' dataset

method	0.5	0.7	0.9
AdaS_knn	0.65(0.02)	0.75(0.01)	0.75(0.02)
AdaS_svm	0.45(0)	0.78(0)	0.86(0.02)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.56(0.15)	0.66(0.09)	0.92(0.06)
LassoJoint_BFGS_lambda.1se	0.51(0.33)	0.66(0.07)	0.92(0.07)
LassoJoint_BFGS_lambda.min	0.41(0.09)	0.46(0.3)	0.69(0.18)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	NaN(NA)	0.91(0.09)
LassoJoint_MM_lambda.1se	0.51(0.09)	0.7(0.08)	0.89(0.05)
LassoJoint_MM_lambda.min	0.29(0.13)	0.74(0.06)	0.83(0.09)
MIF5 Joint BFGS	0.61(0.2)	0.69(0.26)	0.91(0.08)
MIF5 Joint MM	0.73(0.11)	0.88(0.08)	0.95(0.07)

Table 82. Precision score on 'Alon_DS' dataset

method	0.5	0.7	0.9
AdaS_knn	0.83(0.02)	0.51(0.04)	0.71(0.05)
AdaS_svm	0.8(0.03)	0.6(0.01)	0.92(0.08)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.58(0.1)	0.67(0.1)	0.7(0.17)
LassoJoint_BFGS_lambda.1se	0.58(0.1)	0.67(0.08)	0.9(0.16)
LassoJoint_BFGS_lambda.min	0.53(0.36)	0.95(0.1)	0.94(0.13)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	NaN(NA)	0.67(0.18)
LassoJoint_MM_lambda.1se	1(NA)	0.81(0.03)	0.94(0.13)
LassoJoint_MM_lambda.min	0.64(0.13)	0.85(0.09)	0.9(0.15)
MIF5 Joint BFGS	0.89(0.18)	0.82(0.18)	0.82(0.14)
MIF5 Joint MM	0.82(0.29)	0.91(0.12)	0.85(0.12)

Table 83. Precision score on 'lymphoma' dataset

method	0.5	0.7	0.9
AdaS_knn	1(0)	1(0)	1(0)
AdaS_svm	0.28(0.03)	1(0)	1(0)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.72(0.1)	0.65(0.09)	0.63(0.16)
LassoJoint_BFGS_lambda.1se	0.78(0.15)	1(0)	1(0)
LassoJoint_BFGS_lambda.min	1(0)	0.96(0.09)	0.97(0.07)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	NaN(NA)	0.63(0.16)
LassoJoint_MM_lambda.1se	1(0)	1(0)	1(0)
LassoJoint_MM_lambda.min	1(0)	1(0)	0.96(0.09)
MIF5 Joint BFGS	1(0)	1(0)	1(0)
MIF5 Joint MM	1(0)	0.97(0.06)	1(0)

Table 84. Precision score on 'prostate' dataset

method	0.5	0.7	0.9
AdaS_knn	0.75(0.03)	1(0.02)	0.6(0)
AdaS_svm	0.55(0.01)	0.87(0.01)	0.75(0.02)
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.4(0.14)	0.5(0.09)	1(0)
LassoJoint_BFGS_lambda.1se	0.85(0.24)	0.9(0.16)	0.98(0.04)
LassoJoint_BFGS_lambda.min	1(0)	0.89(0.19)	0.97(0.06)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	NaN(NA)	0.98(0.05)
LassoJoint_MM_lambda.1se	0.83(0.24)	0.81(0.14)	0.96(0.06)
LassoJoint_MM_lambda.min	0.9(0.22)	0.77(0.09)	0.96(0.05)
MIF5 Joint BFGS	0.85(0.17)	0.86(0.22)	0.92(0.12)
MIF5 Joint MM	0.89(0.12)	0.89(0.16)	0.92(0.12)

Table 85. Method avg.rank based on Accuracy metrics

method	0.5	0.7	0.9
MIF5 Joint MM	2.67	2.00	4.00
MIF5 Joint BFGS	1.67	3.00	5.33
LassoJoint_BFGS_lambda.1se	3.33	6.67	2.33
AdaS_knn	4.00	4.33	7.00
LassoJoint_BFGS_lambda.min	5.67	7.00	4.67
LassoJoint_MM_lambda.1se	7.00	7.00	4.33
LassoJoint_MM_lambda.min	6.67	5.00	6.67
AdaS_svm	9.67	4.33	5.00
LassoJoint_BFGS_(log(p)/n)^(1/2)	5.33	5.67	8.33
LassoJoint_MM_(log(p)/n)^(1/2)	9.00	10.00	7.33

Table 86. Method avg.rank based on Recall metrics

method	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	2.33	1.67	4.33
MIF5 Joint MM	3.67	3.33	5.33
AdaS_knn	4.00	5.33	4.00
LassoJoint_BFGS_lambda.1se	2.67	6.33	4.33
MIF5 Joint BFGS	3.33	4.67	6.00
AdaS_svm	7.33	4.00	4.33
LassoJoint_BFGS_lambda.min	5.00	8.00	6.00
LassoJoint_MM_lambda.min	7.67	5.00	8.67
LassoJoint_MM_lambda.1se	9.00	6.67	6.33
LassoJoint_MM_(log(p)/n)^(1/2)	10.00	10.00	5.67

Table 87. Method avg.rank based on Precision metrics

method	0.5	0.7	0.9
LassoJoint_BFGS_lambda.min	4.00	4.00	4.00
LassoJoint_MM_lambda.1se	3.33	5.33	3.67
LassoJoint_BFGS_lambda.1se	6.33	4.00	3.00
AdaS_knn	3.67	3.67	6.33
MIF5 Joint MM	4.33	4.33	6.67
LassoJoint_MM_lambda.min	4.00	5.33	6.33
MIF5 Joint BFGS	4.00	5.33	6.33
AdaS_svm	7.33	5.00	4.67
LassoJoint_BFGS_(log(p)/n)^(1/2)	8.00	8.00	6.33
LassoJoint_MM_(log(p)/n)^(1/2)	10.00	10.00	7.67

Table 88. Method avg.rank based on F1 metrics

method	0.5	0.7	0.9
MIF5 Joint MM	3.67	3.00	4.00
LassoJoint_BFGS_lambda.1se	4.00	5.67	2.67
LassoJoint_BFGS_(log(p)/n)^(1/2)	3.00	4.33	5.67
MIF5 Joint BFGS	2.67	5.00	5.33
LassoJoint_MM_lambda.1se	3.67	5.67	4.67
AdaS_knn	4.33	4.33	6.67
AdaS_svm	8.00	3.67	6.00
LassoJoint_BFGS_lambda.min	7.33	7.67	5.00
LassoJoint_MM_lambda.min	8.33	5.67	7.67
LassoJoint_MM_(log(p)/n)^(1/2)	10.00	10.00	7.33

6 Selection methods: the LassoJoint and the MIF5

Table 89. No. of features; dataset 'Alon_DS'

dataset	method	c	no_features
Alon_DS	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	0.00
Alon_DS	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	0.00
Alon_DS	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	0.00
Alon_DS	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	0.00
Alon_DS	LassoJoint_BFGS_lambda.1se	0.30	1.00
Alon_DS	LassoJoint_BFGS_lambda.1se	0.50	0.80
Alon_DS	LassoJoint_BFGS_lambda.1se	0.70	0.40
Alon_DS	LassoJoint_BFGS_lambda.1se	0.90	5.60
Alon_DS	LassoJoint_BFGS_lambda.min	0.30	10.60
Alon_DS	LassoJoint_BFGS_lambda.min	0.50	2.80
Alon_DS	LassoJoint_BFGS_lambda.min	0.70	9.40
Alon_DS	LassoJoint_BFGS_lambda.min	0.90	13.40
Alon_DS	LassoMM_(log(p)/n)^(1/2)	0.30	0.00
Alon_DS	LassoMM_(log(p)/n)^(1/2)	0.50	0.00
Alon_DS	LassoMM_(log(p)/n)^(1/2)	0.70	0.00
Alon_DS	LassoMM_(log(p)/n)^(1/2)	0.90	0.00
Alon_DS	LassoMM_lambda.1se	0.30	2.60
Alon_DS	LassoMM_lambda.1se	0.50	0.60
Alon_DS	LassoMM_lambda.1se	0.70	1.60
Alon_DS	LassoMM_lambda.1se	0.90	6.60
Alon_DS	LassoMM_lambda.min	0.30	9.20
Alon_DS	LassoMM_lambda.min	0.50	4.00
Alon_DS	LassoMM_lambda.min	0.70	12.80
Alon_DS	LassoMM_lambda.min	0.90	13.80

Table 90. No. of features; dataset 'Artif'

dataset	method	c	no_features
Artif	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Artif	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	3.64
Artif	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	5.00
Artif	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	5.00
Artif	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	5.00
Artif	LassoJoint_BFGS_lambda.1se	0.10	0.50
Artif	LassoJoint_BFGS_lambda.1se	0.30	5.04
Artif	LassoJoint_BFGS_lambda.1se	0.50	5.00
Artif	LassoJoint_BFGS_lambda.1se	0.70	5.02
Artif	LassoJoint_BFGS_lambda.1se	0.90	5.20
Artif	LassoJoint_BFGS_lambda.min	0.10	12.66
Artif	LassoJoint_BFGS_lambda.min	0.30	12.64
Artif	LassoJoint_BFGS_lambda.min	0.50	9.62
Artif	LassoJoint_BFGS_lambda.min	0.70	9.22
Artif	LassoJoint_BFGS_lambda.min	0.90	13.94
Artif	LassoMM_(log(p)/n)^(1/2)	0.10	0.00
Artif	LassoMM_(log(p)/n)^(1/2)	0.30	3.64
Artif	LassoMM_(log(p)/n)^(1/2)	0.50	5.00
Artif	LassoMM_(log(p)/n)^(1/2)	0.70	5.00
Artif	LassoMM_(log(p)/n)^(1/2)	0.90	5.00
Artif	LassoMM_lambda.1se	0.10	0.74
Artif	LassoMM_lambda.1se	0.30	5.02
Artif	LassoMM_lambda.1se	0.50	5.00
Artif	LassoMM_lambda.1se	0.70	5.02
Artif	LassoMM_lambda.1se	0.90	5.14
Artif	LassoMM_lambda.min	0.10	11.96
Artif	LassoMM_lambda.min	0.30	12.40
Artif	LassoMM_lambda.min	0.50	9.76
Artif	LassoMM_lambda.min	0.70	8.84
Artif	LassoMM_lambda.min	0.90	13.32

Table 91. No. of features; dataset 'Banknote'

dataset	method	c	no_features
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.06
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	1.68
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	2.98
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	3.00
Banknote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	3.00
Banknote	LassoJoint_BFGS_lambda.1se	0.10	0.06
Banknote	LassoJoint_BFGS_lambda.1se	0.30	2.80
Banknote	LassoJoint_BFGS_lambda.1se	0.50	3.02
Banknote	LassoJoint_BFGS_lambda.1se	0.70	3.00
Banknote	LassoJoint_BFGS_lambda.1se	0.90	3.22
Banknote	LassoJoint_BFGS_lambda.min	0.10	3.90
Banknote	LassoJoint_BFGS_lambda.min	0.30	3.70
Banknote	LassoJoint_BFGS_lambda.min	0.50	3.88
Banknote	LassoJoint_BFGS_lambda.min	0.70	3.74
Banknote	LassoJoint_BFGS_lambda.min	0.90	4.00
Banknote	LassoMM_(log(p)/n)^(1/2)	0.10	0.06
Banknote	LassoMM_(log(p)/n)^(1/2)	0.30	1.68
Banknote	LassoMM_(log(p)/n)^(1/2)	0.50	2.98
Banknote	LassoMM_(log(p)/n)^(1/2)	0.70	3.00
Banknote	LassoMM_(log(p)/n)^(1/2)	0.90	3.00
Banknote	LassoMM_lambda.1se	0.10	0.08
Banknote	LassoMM_lambda.1se	0.30	2.80
Banknote	LassoMM_lambda.1se	0.50	3.04
Banknote	LassoMM_lambda.1se	0.70	3.00
Banknote	LassoMM_lambda.1se	0.90	3.26
Banknote	LassoMM_lambda.min	0.10	3.88
Banknote	LassoMM_lambda.min	0.30	3.72
Banknote	LassoMM_lambda.min	0.50	3.86
Banknote	LassoMM_lambda.min	0.70	3.72
Banknote	LassoMM_lambda.min	0.90	4.00

Table 92. No. of features; dataset 'Breastc'

dataset	method	c	no_features
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	3.00
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	4.38
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	5.18
Breastc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	6.92
Breastc	LassoJoint_BFGS_lambda.1se	0.10	0.22
Breastc	LassoJoint_BFGS_lambda.1se	0.30	3.92
Breastc	LassoJoint_BFGS_lambda.1se	0.50	5.26
Breastc	LassoJoint_BFGS_lambda.1se	0.70	6.08
Breastc	LassoJoint_BFGS_lambda.1se	0.90	7.34
Breastc	LassoJoint_BFGS_lambda.min	0.10	5.58
Breastc	LassoJoint_BFGS_lambda.min	0.30	5.20
Breastc	LassoJoint_BFGS_lambda.min	0.50	6.64
Breastc	LassoJoint_BFGS_lambda.min	0.70	8.24
Breastc	LassoJoint_BFGS_lambda.min	0.90	8.22
Breastc	LassoMM_(log(p)/n)^(1/2)	0.10	0.00
Breastc	LassoMM_(log(p)/n)^(1/2)	0.30	3.00
Breastc	LassoMM_(log(p)/n)^(1/2)	0.50	4.38
Breastc	LassoMM_(log(p)/n)^(1/2)	0.70	5.18
Breastc	LassoMM_(log(p)/n)^(1/2)	0.90	6.92
Breastc	LassoMM_lambda.1se	0.10	0.14
Breastc	LassoMM_lambda.1se	0.30	3.92
Breastc	LassoMM_lambda.1se	0.50	5.42
Breastc	LassoMM_lambda.1se	0.70	6.10
Breastc	LassoMM_lambda.1se	0.90	7.34
Breastc	LassoMM_lambda.min	0.10	5.58
Breastc	LassoMM_lambda.min	0.30	5.28
Breastc	LassoMM_lambda.min	0.50	6.70
Breastc	LassoMM_lambda.min	0.70	8.20
Breastc	LassoMM_lambda.min	0.90	8.28

Table 93. No. of features; dataset 'Credit_a'

dataset	method	c	no_features
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	1.00
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	1.00
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	1.96
Credit_a	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	1.82
Credit_a	LassoJoint_BFGS_lambda.1se	0.10	0.04
Credit_a	LassoJoint_BFGS_lambda.1se	0.30	0.90
Credit_a	LassoJoint_BFGS_lambda.1se	0.50	1.06
Credit_a	LassoJoint_BFGS_lambda.1se	0.70	2.16
Credit_a	LassoJoint_BFGS_lambda.1se	0.90	5.90
Credit_a	LassoJoint_BFGS_lambda.min	0.10	3.76
Credit_a	LassoJoint_BFGS_lambda.min	0.30	5.20
Credit_a	LassoJoint_BFGS_lambda.min	0.50	9.32
Credit_a	LassoJoint_BFGS_lambda.min	0.70	9.62
Credit_a	LassoJoint_BFGS_lambda.min	0.90	17.30
Credit_a	LassoMM_(log(p)/n)^(1/2)	0.10	0.00
Credit_a	LassoMM_(log(p)/n)^(1/2)	0.30	1.00
Credit_a	LassoMM_(log(p)/n)^(1/2)	0.50	1.00
Credit_a	LassoMM_(log(p)/n)^(1/2)	0.70	1.96
Credit_a	LassoMM_(log(p)/n)^(1/2)	0.90	1.82
Credit_a	LassoMM_lambda.1se	0.10	0.00
Credit_a	LassoMM_lambda.1se	0.30	0.96
Credit_a	LassoMM_lambda.1se	0.50	1.20
Credit_a	LassoMM_lambda.1se	0.70	2.38
Credit_a	LassoMM_lambda.1se	0.90	5.88
Credit_a	LassoMM_lambda.min	0.10	3.68
Credit_a	LassoMM_lambda.min	0.30	6.44
Credit_a	LassoMM_lambda.min	0.50	9.34
Credit_a	LassoMM_lambda.min	0.70	9.64
Credit_a	LassoMM_lambda.min	0.90	17.60

Table 94. No. of features; dataset 'Credit_g'

dataset	method	c	no_features
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	0.08
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	1.08
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	2.50
Credit_g	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	3.70
Credit_g	LassoJoint_BFGS_lambda.1se	0.10	0.00
Credit_g	LassoJoint_BFGS_lambda.1se	0.30	0.00
Credit_g	LassoJoint_BFGS_lambda.1se	0.50	2.92
Credit_g	LassoJoint_BFGS_lambda.1se	0.70	7.26
Credit_g	LassoJoint_BFGS_lambda.1se	0.90	11.42
Credit_g	LassoJoint_BFGS_lambda.min	0.10	0.36
Credit_g	LassoJoint_BFGS_lambda.min	0.30	4.84
Credit_g	LassoJoint_BFGS_lambda.min	0.50	11.38
Credit_g	LassoJoint_BFGS_lambda.min	0.70	15.02
Credit_g	LassoJoint_BFGS_lambda.min	0.90	18.40
Credit_g	LassoMM_(log(p)/n)^(1/2)	0.10	0.00
Credit_g	LassoMM_(log(p)/n)^(1/2)	0.30	0.08
Credit_g	LassoMM_(log(p)/n)^(1/2)	0.50	1.08
Credit_g	LassoMM_(log(p)/n)^(1/2)	0.70	2.50
Credit_g	LassoMM_(log(p)/n)^(1/2)	0.90	3.70
Credit_g	LassoMM_lambda.1se	0.10	0.00
Credit_g	LassoMM_lambda.1se	0.30	0.00
Credit_g	LassoMM_lambda.1se	0.50	3.06
Credit_g	LassoMM_lambda.1se	0.70	7.08
Credit_g	LassoMM_lambda.1se	0.90	11.38
Credit_g	LassoMM_lambda.min	0.10	0.32
Credit_g	LassoMM_lambda.min	0.30	4.86
Credit_g	LassoMM_lambda.min	0.50	11.44
Credit_g	LassoMM_lambda.min	0.70	15.08
Credit_g	LassoMM_lambda.min	0.90	18.16

Table 95. No. of features; dataset 'dhfr'

dataset	method	c	no_features
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	0.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	1.00
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	1.20
dhfr	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	4.60
dhfr	LassoJoint_BFGS_lambda.1se	0.10	0.00
dhfr	LassoJoint_BFGS_lambda.1se	0.30	1.20
dhfr	LassoJoint_BFGS_lambda.1se	0.50	6.80
dhfr	LassoJoint_BFGS_lambda.1se	0.70	12.00
dhfr	LassoJoint_BFGS_lambda.1se	0.90	12.20
dhfr	LassoJoint_BFGS_lambda.min	0.10	3.00
dhfr	LassoJoint_BFGS_lambda.min	0.30	15.60
dhfr	LassoJoint_BFGS_lambda.min	0.50	11.80
dhfr	LassoJoint_BFGS_lambda.min	0.70	26.60
dhfr	LassoJoint_BFGS_lambda.min	0.90	23.20
dhfr	LassoMM_(log(p)/n)^(1/2)	0.10	0.00
dhfr	LassoMM_(log(p)/n)^(1/2)	0.30	0.00
dhfr	LassoMM_(log(p)/n)^(1/2)	0.50	1.00
dhfr	LassoMM_(log(p)/n)^(1/2)	0.70	1.20
dhfr	LassoMM_(log(p)/n)^(1/2)	0.90	4.60
dhfr	LassoMM_lambda.1se	0.10	0.00
dhfr	LassoMM_lambda.1se	0.30	0.20
dhfr	LassoMM_lambda.1se	0.50	5.80
dhfr	LassoMM_lambda.1se	0.70	13.40
dhfr	LassoMM_lambda.1se	0.90	11.80
dhfr	LassoMM_lambda.min	0.10	3.20
dhfr	LassoMM_lambda.min	0.30	15.00
dhfr	LassoMM_lambda.min	0.50	13.40
dhfr	LassoMM_lambda.min	0.70	23.20
dhfr	LassoMM_lambda.min	0.90	21.40

Table 96. No. of features; dataset 'Diabetes'

dataset	method	c	no_features
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	1.00
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	1.84
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	2.76
Diabetes	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	3.52
Diabetes	LassoJoint_BFGS_lambda.1se	0.10	0.00
Diabetes	LassoJoint_BFGS_lambda.1se	0.30	0.26
Diabetes	LassoJoint_BFGS_lambda.1se	0.50	1.98
Diabetes	LassoJoint_BFGS_lambda.1se	0.70	2.86
Diabetes	LassoJoint_BFGS_lambda.1se	0.90	4.14
Diabetes	LassoJoint_BFGS_lambda.min	0.10	2.76
Diabetes	LassoJoint_BFGS_lambda.min	0.30	3.98
Diabetes	LassoJoint_BFGS_lambda.min	0.50	6.36
Diabetes	LassoJoint_BFGS_lambda.min	0.70	4.94
Diabetes	LassoJoint_BFGS_lambda.min	0.90	7.60
Diabetes	LassoMM_(log(p)/n)^(1/2)	0.10	0.00
Diabetes	LassoMM_(log(p)/n)^(1/2)	0.30	1.00
Diabetes	LassoMM_(log(p)/n)^(1/2)	0.50	1.84
Diabetes	LassoMM_(log(p)/n)^(1/2)	0.70	2.76
Diabetes	LassoMM_(log(p)/n)^(1/2)	0.90	3.52
Diabetes	LassoMM_lambda.1se	0.10	0.00
Diabetes	LassoMM_lambda.1se	0.30	0.14
Diabetes	LassoMM_lambda.1se	0.50	2.00
Diabetes	LassoMM_lambda.1se	0.70	2.88
Diabetes	LassoMM_lambda.1se	0.90	4.12
Diabetes	LassoMM_lambda.min	0.10	2.84
Diabetes	LassoMM_lambda.min	0.30	4.04
Diabetes	LassoMM_lambda.min	0.50	6.14
Diabetes	LassoMM_lambda.min	0.70	5.08
Diabetes	LassoMM_lambda.min	0.90	7.50

Table 97. No. of features; dataset 'lymphoma'

dataset	method	c	no_features
lymphoma	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	0.00
lymphoma	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	0.00
lymphoma	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	0.00
lymphoma	LassoJoint_BFGS_lambda.1se	0.50	2.60
lymphoma	LassoJoint_BFGS_lambda.1se	0.70	2.00
lymphoma	LassoJoint_BFGS_lambda.1se	0.90	4.80
lymphoma	LassoJoint_BFGS_lambda.min	0.50	16.80
lymphoma	LassoJoint_BFGS_lambda.min	0.70	10.20
lymphoma	LassoJoint_BFGS_lambda.min	0.90	12.80
lymphoma	LassoMM_(log(p)/n)^(1/2)	0.50	0.00
lymphoma	LassoMM_(log(p)/n)^(1/2)	0.70	0.00
lymphoma	LassoMM_(log(p)/n)^(1/2)	0.90	0.00
lymphoma	LassoMM_lambda.1se	0.50	4.60
lymphoma	LassoMM_lambda.1se	0.70	4.00
lymphoma	LassoMM_lambda.1se	0.90	3.80
lymphoma	LassoMM_lambda.min	0.50	15.00
lymphoma	LassoMM_lambda.min	0.70	9.40
lymphoma	LassoMM_lambda.min	0.90	15.20

Table 98. No. of features; dataset 'prostate'

dataset	method	c	no_features
prostate	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	0.00
prostate	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	0.00
prostate	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	0.00
prostate	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	1.00
prostate	LassoJoint_BFGS_lambda.1se	0.30	1.80
prostate	LassoJoint_BFGS_lambda.1se	0.50	1.00
prostate	LassoJoint_BFGS_lambda.1se	0.70	4.80
prostate	LassoJoint_BFGS_lambda.1se	0.90	6.20
prostate	LassoJoint_BFGS_lambda.min	0.30	10.80
prostate	LassoJoint_BFGS_lambda.min	0.50	7.80
prostate	LassoJoint_BFGS_lambda.min	0.70	25.40
prostate	LassoJoint_BFGS_lambda.min	0.90	23.40
prostate	LassoMM_(log(p)/n)^(1/2)	0.30	0.00
prostate	LassoMM_(log(p)/n)^(1/2)	0.50	0.00
prostate	LassoMM_(log(p)/n)^(1/2)	0.70	0.00
prostate	LassoMM_(log(p)/n)^(1/2)	0.90	1.00
prostate	LassoMM_lambda.1se	0.30	0.20
prostate	LassoMM_lambda.1se	0.50	0.60
prostate	LassoMM_lambda.1se	0.70	5.80
prostate	LassoMM_lambda.1se	0.90	8.00
prostate	LassoMM_lambda.min	0.30	12.00
prostate	LassoMM_lambda.min	0.50	6.40
prostate	LassoMM_lambda.min	0.70	21.00
prostate	LassoMM_lambda.min	0.90	21.80

Table 99. No. of features; dataset 'Spambase'

dataset	method	c	no_features
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	7.16
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	16.30
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	18.88
Spambase	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	23.12
Spambase	LassoJoint_BFGS_lambda.1se	0.10	5.12
Spambase	LassoJoint_BFGS_lambda.1se	0.30	20.84
Spambase	LassoJoint_BFGS_lambda.1se	0.50	32.10
Spambase	LassoJoint_BFGS_lambda.1se	0.70	30.56
Spambase	LassoJoint_BFGS_lambda.1se	0.90	36.06
Spambase	LassoJoint_BFGS_lambda.min	0.10	33.08
Spambase	LassoJoint_BFGS_lambda.min	0.30	39.20
Spambase	LassoJoint_BFGS_lambda.min	0.50	45.90
Spambase	LassoJoint_BFGS_lambda.min	0.70	44.54
Spambase	LassoJoint_BFGS_lambda.min	0.90	46.38
Spambase	LassoMM_(log(p)/n)^(1/2)	0.10	0.00
Spambase	LassoMM_(log(p)/n)^(1/2)	0.30	7.16
Spambase	LassoMM_(log(p)/n)^(1/2)	0.50	16.30
Spambase	LassoMM_(log(p)/n)^(1/2)	0.70	18.88
Spambase	LassoMM_(log(p)/n)^(1/2)	0.90	23.12
Spambase	LassoMM_lambda.1se	0.10	5.20
Spambase	LassoMM_lambda.1se	0.30	20.78
Spambase	LassoMM_lambda.1se	0.50	32.70
Spambase	LassoMM_lambda.1se	0.70	30.26
Spambase	LassoMM_lambda.1se	0.90	35.90
Spambase	LassoMM_lambda.min	0.10	32.16
Spambase	LassoMM_lambda.min	0.30	39.76
Spambase	LassoMM_lambda.min	0.50	46.18
Spambase	LassoMM_lambda.min	0.70	44.58
Spambase	LassoMM_lambda.min	0.90	46.52

Table 100. No. of features; dataset 'Vote'

dataset	method	c	no_features
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	1.12
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	3.56
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	1.92
Vote	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	3.10
Vote	LassoJoint_BFGS_lambda.1se	0.10	0.00
Vote	LassoJoint_BFGS_lambda.1se	0.30	1.48
Vote	LassoJoint_BFGS_lambda.1se	0.50	4.72
Vote	LassoJoint_BFGS_lambda.1se	0.70	2.50
Vote	LassoJoint_BFGS_lambda.1se	0.90	4.16
Vote	LassoJoint_BFGS_lambda.min	0.10	3.86
Vote	LassoJoint_BFGS_lambda.min	0.30	6.58
Vote	LassoJoint_BFGS_lambda.min	0.50	8.86
Vote	LassoJoint_BFGS_lambda.min	0.70	6.42
Vote	LassoJoint_BFGS_lambda.min	0.90	12.56
Vote	LassoMM_(log(p)/n)^(1/2)	0.10	0.00
Vote	LassoMM_(log(p)/n)^(1/2)	0.30	1.12
Vote	LassoMM_(log(p)/n)^(1/2)	0.50	3.56
Vote	LassoMM_(log(p)/n)^(1/2)	0.70	1.92
Vote	LassoMM_(log(p)/n)^(1/2)	0.90	3.10
Vote	LassoMM_lambda.1se	0.10	0.00
Vote	LassoMM_lambda.1se	0.30	1.34
Vote	LassoMM_lambda.1se	0.50	4.68
Vote	LassoMM_lambda.1se	0.70	2.52
Vote	LassoMM_lambda.1se	0.90	4.62
Vote	LassoMM_lambda.min	0.10	4.22
Vote	LassoMM_lambda.min	0.30	6.26
Vote	LassoMM_lambda.min	0.50	8.60
Vote	LassoMM_lambda.min	0.70	6.66
Vote	LassoMM_lambda.min	0.90	12.62

Table 101. No. of features; dataset 'Wdbc'

dataset	method	c	no_features
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.10	0.00
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.30	1.70
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.50	3.60
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.70	3.12
Wdbc	LassoJoint_BFGS_(log(p)/n)^(1/2)	0.90	3.96
Wdbc	LassoJoint_BFGS_lambda.1se	0.10	0.14
Wdbc	LassoJoint_BFGS_lambda.1se	0.30	3.52
Wdbc	LassoJoint_BFGS_lambda.1se	0.50	6.80
Wdbc	LassoJoint_BFGS_lambda.1se	0.70	5.24
Wdbc	LassoJoint_BFGS_lambda.1se	0.90	7.44
Wdbc	LassoJoint_BFGS_lambda.min	0.10	5.86
Wdbc	LassoJoint_BFGS_lambda.min	0.30	11.50
Wdbc	LassoJoint_BFGS_lambda.min	0.50	13.20
Wdbc	LassoJoint_BFGS_lambda.min	0.70	15.62
Wdbc	LassoJoint_BFGS_lambda.min	0.90	11.10
Wdbc	LassoMM_(log(p)/n)^(1/2)	0.10	0.00
Wdbc	LassoMM_(log(p)/n)^(1/2)	0.30	1.70
Wdbc	LassoMM_(log(p)/n)^(1/2)	0.50	3.60
Wdbc	LassoMM_(log(p)/n)^(1/2)	0.70	3.12
Wdbc	LassoMM_(log(p)/n)^(1/2)	0.90	3.96
Wdbc	LassoMM_lambda.1se	0.10	0.14
Wdbc	LassoMM_lambda.1se	0.30	3.36
Wdbc	LassoMM_lambda.1se	0.50	6.88
Wdbc	LassoMM_lambda.1se	0.70	5.64
Wdbc	LassoMM_lambda.1se	0.90	7.26
Wdbc	LassoMM_lambda.min	0.10	6.06
Wdbc	LassoMM_lambda.min	0.30	11.38
Wdbc	LassoMM_lambda.min	0.50	12.74
Wdbc	LassoMM_lambda.min	0.70	15.84
Wdbc	LassoMM_lambda.min	0.90	10.90

Table 102. Accuracy score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.55(0.08)	0.87(0.02)	0.99(0.02)	0.99(0)	0.98(0.05)
LassoJoint_BFGS_lambda.1se	0.57(0.11)	0.99(0.03)	0.99(0.01)	0.99(0)	0.98(0.06)
LassoJoint_BFGS_lambda.min	0.97(0.02)	0.99(0)	0.99(0.01)	0.99(0)	0.98(0.05)
LassoJoint_MM_(log(p)/n)^(1/2)	0.48(0.09)	0.86(0.02)	0.99(0.02)	0.99(0.01)	1(0)
LassoJoint_MM_lambda.1se	0.5(0.13)	0.95(0.05)	0.99(0.01)	0.99(0.01)	1(0)
LassoJoint_MM_lambda.min	0.97(0.01)	0.98(0.01)	0.99(0.01)	0.99(0.01)	1(0)
MIF5 Joint BFGS	0.99(0.02)	0.99(0.01)	0.99(0)	0.99(0)	0.95(0.09)
MIF5 Joint MM	0.94(0.04)	0.98(0.01)	0.99(0.01)	0.99(0.01)	1(0)

Table 103. Accuracy score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.55(0.05)	0.9(0.06)	0.88(0.09)	0.95(0.02)	0.85(0.17)
LassoJoint_BFGS_lambda.1se	0.59(0.1)	0.9(0.07)	0.88(0.1)	0.95(0.02)	0.83(0.18)
LassoJoint_BFGS_lambda.min	0.9(0.08)	0.91(0.04)	0.87(0.11)	0.94(0.03)	0.84(0.18)
LassoJoint_MM_(log(p)/n)^(1/2)	0.55(0.05)	0.92(0.03)	0.89(0.07)	0.95(0.02)	0.95(0.02)
LassoJoint_MM_lambda.1se	0.59(0.11)	0.93(0.03)	0.89(0.07)	0.95(0.02)	0.95(0.02)
LassoJoint_MM_lambda.min	0.91(0.04)	0.93(0.03)	0.88(0.08)	0.95(0.02)	0.95(0.02)
MIF5 Joint BFGS	0.86(0.05)	0.9(0.04)	0.91(0.06)	0.91(0.04)	0.76(0.09)
MIF5 Joint MM	0.86(0.05)	0.89(0.04)	0.92(0.05)	0.91(0.03)	0.92(0.03)

Table 104. Accuracy score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.45(0.04)	0.48(0.11)	0.83(0.11)	0.86(0.03)	0.86(0.03)
LassoJoint_BFGS_lambda.1se	0.45(0.04)	0.48(0.11)	0.83(0.11)	0.86(0.03)	0.74(0.13)
LassoJoint_BFGS_lambda.min	0.53(0.14)	0.73(0.18)	0.82(0.1)	0.8(0.11)	0.67(0.11)
LassoJoint_MM_(log(p)/n)^(1/2)	0.45(0.04)	0.87(0.03)	0.86(0.02)	0.86(0.03)	0.86(0.03)
LassoJoint_MM_lambda.1se	0.45(0.04)	0.85(0.09)	0.86(0.02)	0.86(0.03)	0.86(0.03)
LassoJoint_MM_lambda.min	0.62(0.17)	0.84(0.05)	0.84(0.03)	0.85(0.04)	0.86(0.03)
MIF5 Joint BFGS	0.66(0.19)	0.85(0.04)	0.84(0.05)	0.86(0.03)	0.86(0.03)
MIF5 Joint MM	0.82(0.1)	0.85(0.03)	0.85(0.03)	0.85(0.03)	0.85(0.03)

Table 105. Accuracy score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.7(0.03)	0.64(0.16)	0.57(0.17)	0.64(0.13)	0.72(0.07)
LassoJoint_BFGS_lambda.1se	0.7(0.03)	0.66(0.14)	0.62(0.16)	0.66(0.13)	0.73(0.04)
LassoJoint_BFGS_lambda.min	0.68(0.08)	0.64(0.17)	0.67(0.1)	0.73(0.04)	0.73(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	0.3(0.03)	0.31(0.08)	0.64(0.04)	0.67(0.05)	0.74(0.02)
LassoJoint_MM_lambda.1se	0.3(0.03)	0.29(0.03)	0.67(0.06)	0.7(0.04)	0.75(0.02)
LassoJoint_MM_lambda.min	0.32(0.08)	0.67(0.11)	0.67(0.05)	0.73(0.04)	0.75(0.02)
MIF5 Joint BFGS	0.53(0.17)	0.43(0.18)	0.52(0.18)	0.73(0.03)	0.74(0.03)
MIF5 Joint MM	0.53(0.08)	0.54(0.13)	0.59(0.1)	0.73(0.03)	0.74(0.03)

Table 106. Accuracy score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.55(0.12)	0.58(0.09)	0.71(0.1)	0.78(0.02)	0.85(0.04)
LassoJoint_BFGS_lambda.1se	0.55(0.12)	0.58(0.1)	0.84(0.02)	0.77(0.08)	0.88(0.05)
LassoJoint_BFGS_lambda.min	0.49(0.08)	0.74(0.05)	0.82(0.04)	0.74(0.09)	0.83(0.1)
LassoJoint_MM_(log(p)/n)^(1/2)	0.39(0.05)	0.42(0.09)	0.71(0.1)	0.78(0.03)	0.86(0.03)
LassoJoint_MM_lambda.1se	0.39(0.05)	0.5(0.18)	0.8(0.05)	0.85(0.03)	0.89(0.01)
LassoJoint_MM_lambda.min	0.49(0.19)	0.66(0.07)	0.81(0.04)	0.84(0.03)	0.87(0.04)
MIF5 Joint BFGS	0.51(0.19)	0.75(0.07)	0.78(0.05)	0.71(0.19)	0.73(0.1)
MIF5 Joint MM	0.51(0.19)	0.75(0.07)	0.74(0.05)	0.73(0.17)	0.76(0.09)

Table 107. Accuracy score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.35(0.04)	0.74(0.03)	0.76(0.04)	0.64(0.18)	0.36(0.09)
LassoJoint_BFGS_lambda.1se	0.35(0.04)	0.45(0.17)	0.76(0.04)	0.64(0.18)	0.36(0.08)
LassoJoint_BFGS_lambda.min	0.61(0.1)	0.75(0.03)	0.76(0.04)	0.57(0.2)	0.36(0.06)
LassoJoint_MM_(log(p)/n)^(1/2)	0.35(0.04)	0.73(0.04)	0.77(0.04)	0.75(0.03)	0.76(0.03)
LassoJoint_MM_lambda.1se	0.35(0.04)	0.4(0.13)	0.76(0.07)	0.75(0.03)	0.76(0.03)
LassoJoint_MM_lambda.min	0.61(0.07)	0.74(0.04)	0.76(0.03)	0.75(0.03)	0.77(0.03)
MIF5 Joint BFGS	0.73(0.03)	0.74(0.04)	0.75(0.03)	0.77(0.03)	0.36(0.04)
MIF5 Joint MM	0.7(0.07)	0.75(0.04)	0.75(0.03)	0.77(0.03)	0.75(0.03)

Table 108. Accuracy score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.61(0.01)	0.43(0.12)	0.69(0.25)	0.5(0.21)	0.7(0.22)
LassoJoint_BFGS_lambda.1se	0.69(0.16)	0.86(0.09)	0.85(0.16)	0.41(0.07)	0.67(0.23)
LassoJoint_BFGS_lambda.min	0.82(0.03)	0.88(0.02)	0.86(0.14)	0.4(0.07)	0.67(0.25)
LassoJoint_MM_(log(p)/n)^(1/2)	0.39(0.01)	0.44(0.12)	0.86(0.05)	0.89(0.01)	0.91(0.01)
LassoJoint_MM_lambda.1se	0.51(0.13)	0.84(0.05)	0.89(0.01)	0.9(0.01)	0.92(0.01)
LassoJoint_MM_lambda.min	0.62(0.05)	0.84(0.02)	0.89(0.01)	0.9(0.01)	0.92(0.01)
MIF5 Joint BFGS	0.43(0.05)	0.58(0.06)	0.51(0.07)	0.59(0.04)	0.52(0.04)
MIF5 Joint MM	0.43(0.03)	0.58(0.06)	0.51(0.07)	0.82(0.02)	0.84(0.01)

Table 109. Accuracy score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.68(0.07)	0.4(0.22)	0.92(0.03)	0.88(0.18)	0.93(0.03)
LassoJoint_BFGS_lambda.1se	0.68(0.07)	0.51(0.29)	0.92(0.03)	0.93(0.04)	0.93(0.03)
LassoJoint_BFGS_lambda.min	0.77(0.14)	0.66(0.27)	0.89(0.05)	0.93(0.03)	0.9(0.04)
LassoJoint_MM_(log(p)/n)^(1/2)	0.32(0.07)	0.95(0.03)	0.91(0.04)	0.93(0.03)	0.93(0.03)
LassoJoint_MM_lambda.1se	0.32(0.07)	0.93(0.09)	0.92(0.04)	0.93(0.03)	0.93(0.03)
LassoJoint_MM_lambda.min	0.64(0.19)	0.67(0.2)	0.89(0.06)	0.93(0.04)	0.92(0.03)

Table 110. Accuracy score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.36(0.04)	0.92(0.02)	0.93(0.03)	0.94(0.02)	0.67(0.28)
LassoJoint_BFGS_lambda.1se	0.36(0.04)	0.93(0.03)	0.94(0.02)	0.91(0.12)	0.63(0.17)
LassoJoint_BFGS_lambda.min	0.77(0.1)	0.71(0.25)	0.93(0.03)	0.67(0.24)	0.58(0.16)
LassoJoint_MM_(log(p)/n)^(1/2)	0.36(0.04)	0.9(0.03)	0.92(0.03)	0.94(0.02)	0.96(0.02)
LassoJoint_MM_lambda.1se	0.36(0.04)	0.9(0.04)	0.93(0.03)	0.94(0.02)	0.97(0.02)
LassoJoint_MM_lambda.min	0.64(0.08)	0.72(0.21)	0.88(0.06)	0.91(0.04)	0.97(0.02)
MIF5 Joint BFGS	0.82(0.18)	0.92(0.03)	0.93(0.02)	0.9(0.1)	0.52(0.24)
MIF5 Joint MM	0.73(0.14)	0.9(0.03)	0.93(0.02)	0.92(0.03)	0.95(0.02)

Table 111. Recall score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.91(0.27)	0.87(0.05)	1(0.02)	1(0)	0.98(0.08)
LassoJoint_BFGS_lambda.1se	0.9(0.27)	0.99(0.03)	1(0)	1(0)	0.98(0.09)
LassoJoint_BFGS_lambda.min	0.99(0.01)	1(0.01)	1(0)	1(0)	0.98(0.08)
LassoJoint_MM_(log(p)/n)^(1/2)	0.04(0.17)	0.81(0.04)	0.98(0.03)	0.98(0.01)	0.99(0.01)
LassoJoint_MM_lambda.1se	0.09(0.24)	0.93(0.07)	0.99(0.01)	0.98(0.01)	0.99(0.01)
LassoJoint_MM_lambda.min	0.94(0.03)	0.96(0.02)	0.99(0.01)	0.98(0.01)	0.99(0.01)
MIF5 Joint BFGS	0.99(0.02)	0.99(0.01)	1(0)	1(0)	0.92(0.16)
MIF5 Joint MM	0.9(0.06)	0.96(0.01)	0.97(0.01)	0.99(0.01)	0.99(0.01)

Table 112. Recall score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.89(0.14)	0.75(0.2)	0.94(0.04)	0.71(0.4)
LassoJoint_BFGS_lambda.1se	0.1(0.24)	0.91(0.14)	0.74(0.21)	0.94(0.04)	0.66(0.43)
LassoJoint_BFGS_lambda.min	0.85(0.16)	0.93(0.05)	0.73(0.23)	0.92(0.05)	0.67(0.42)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.88(0.07)	0.77(0.14)	0.94(0.04)	0.93(0.04)
LassoJoint_MM_lambda.1se	0.09(0.24)	0.89(0.06)	0.76(0.15)	0.93(0.04)	0.93(0.04)
LassoJoint_MM_lambda.min	0.8(0.08)	0.89(0.06)	0.76(0.16)	0.93(0.04)	0.93(0.04)
MIF5 Joint BFGS	0.54(0.15)	0.82(0.1)	0.82(0.2)	0.85(0.09)	0.13(0.3)
MIF5 Joint MM	0.53(0.16)	0.74(0.11)	0.82(0.15)	0.84(0.09)	0.81(0.1)

Table 113. Recall score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.05(0.2)	0.75(0.2)	0.8(0.04)	0.79(0.04)
LassoJoint_BFGS_lambda.1se	0(0)	0.05(0.2)	0.75(0.19)	0.8(0.04)	0.56(0.25)
LassoJoint_BFGS_lambda.min	0.15(0.27)	0.59(0.37)	0.78(0.19)	0.72(0.23)	0.43(0.21)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.8(0.04)	0.8(0.04)	0.8(0.04)	0.79(0.04)
LassoJoint_MM_lambda.1se	0(0)	0.77(0.16)	0.8(0.04)	0.8(0.04)	0.8(0.04)
LassoJoint_MM_lambda.min	0.33(0.34)	0.76(0.09)	0.8(0.05)	0.8(0.07)	0.83(0.04)
MIF5 Joint BFGS	0.44(0.41)	0.84(0.07)	0.75(0.1)	0.8(0.07)	0.78(0.07)
MIF5 Joint MM	0.71(0.19)	0.75(0.06)	0.75(0.06)	0.76(0.06)	0.76(0.06)

Table 114. Recall score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	0.84(0.37)	0.53(0.35)	0.65(0.26)	0.81(0.13)
LassoJoint_BFGS_lambda.1se	1(0)	0.88(0.33)	0.61(0.33)	0.68(0.26)	0.77(0.06)
LassoJoint_BFGS_lambda.min	0.95(0.19)	0.66(0.35)	0.65(0.18)	0.81(0.1)	0.76(0.07)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.03(0.12)	0.59(0.09)	0.69(0.12)	0.83(0.03)
LassoJoint_MM_lambda.1se	0(0)	0(0)	0.68(0.14)	0.73(0.12)	0.82(0.03)
LassoJoint_MM_lambda.min	0.05(0.16)	0.69(0.2)	0.66(0.1)	0.79(0.09)	0.82(0.04)
MIF5 Joint BFGS	0.54(0.4)	0.24(0.35)	0.4(0.34)	0.89(0.07)	0.9(0.04)
MIF5 Joint MM	0.49(0.17)	0.4(0.23)	0.51(0.19)	0.87(0.07)	0.89(0.04)

Table 115. Recall score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.6(0.55)	1(0)	0.69(0.15)	0.89(0.04)	0.9(0.03)
LassoJoint_BFGS_lambda.1se	0.6(0.55)	0.93(0.16)	0.85(0.06)	0.67(0.18)	0.87(0.07)
LassoJoint_BFGS_lambda.min	0.3(0.41)	0.67(0.07)	0.84(0.09)	0.6(0.15)	0.79(0.16)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0(0)	0.69(0.14)	0.88(0.03)	0.91(0.04)
LassoJoint_MM_lambda.1se	0(0)	0.24(0.33)	0.78(0.06)	0.83(0.05)	0.87(0.01)
LassoJoint_MM_lambda.min	0.2(0.33)	0.48(0.09)	0.78(0.07)	0.81(0.07)	0.84(0.06)
MIF5 Joint BFGS	0.35(0.37)	0.88(0.06)	0.91(0.13)	0.9(0.16)	0.97(0.03)
MIF5 Joint MM	0.32(0.35)	0.84(0.05)	0.82(0.1)	0.91(0.16)	0.97(0.03)

Table 116. Recall score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.88(0.05)	0.87(0.05)	0.59(0.35)	0.04(0.17)
LassoJoint_BFGS_lambda.1se	0(0)	0.2(0.37)	0.88(0.06)	0.59(0.35)	0.04(0.17)
LassoJoint_BFGS_lambda.min	0.5(0.22)	0.86(0.05)	0.84(0.07)	0.45(0.39)	0.02(0.08)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.82(0.05)	0.86(0.05)	0.8(0.04)	0.87(0.04)
LassoJoint_MM_lambda.1se	0(0)	0.1(0.26)	0.84(0.14)	0.8(0.04)	0.87(0.04)
LassoJoint_MM_lambda.min	0.47(0.12)	0.8(0.05)	0.83(0.06)	0.79(0.05)	0.88(0.04)
MIF5 Joint BFGS	0.91(0.05)	0.9(0.11)	0.88(0.04)	0.9(0.03)	0.01(0.04)
MIF5 Joint MM	0.69(0.12)	0.82(0.08)	0.87(0.04)	0.89(0.03)	0.85(0.04)

Table 117. Recall score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	0.07(0.2)	0.55(0.44)	0.2(0.39)	0.56(0.4)
LassoJoint_BFGS_lambda.1se	0.62(0.32)	0.86(0.16)	0.82(0.29)	0.03(0.13)	0.48(0.42)
LassoJoint_BFGS_lambda.min	0.79(0.06)	0.89(0.03)	0.84(0.25)	0.03(0.13)	0.49(0.44)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.09(0.2)	0.85(0.1)	0.92(0.02)	0.94(0.01)
LassoJoint_MM_lambda.1se	0.21(0.23)	0.78(0.09)	0.89(0.02)	0.93(0.01)	0.95(0.01)
LassoJoint_MM_lambda.min	0.39(0.09)	0.78(0.04)	0.87(0.02)	0.93(0.01)	0.94(0.01)
MIF5 Joint BFGS	0.02(0.09)	0(0)	0(0)	0(0)	0(0)
MIF5 Joint MM	0.01(0.04)	0(0)	0(0)	0.67(0.05)	0.88(0.03)

Table 118. Recall score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	1(0)	0.13(0.32)	0.91(0.05)	0.85(0.26)	0.92(0.04)
LassoJoint_BFGS_lambda.1se	1(0)	0.28(0.44)	0.91(0.05)	0.92(0.04)	0.92(0.04)
LassoJoint_BFGS_lambda.min	0.73(0.22)	0.5(0.41)	0.89(0.07)	0.92(0.04)	0.89(0.06)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.95(0.03)	0.9(0.06)	0.93(0.04)	0.92(0.04)
LassoJoint_MM_lambda.1se	0(0)	0.92(0.12)	0.89(0.05)	0.93(0.04)	0.92(0.04)
LassoJoint_MM_lambda.min	0.48(0.28)	0.54(0.28)	0.86(0.08)	0.91(0.04)	0.92(0.04)

Table 119. Recall score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0(0)	0.91(0.03)	0.95(0.05)	0.96(0.02)	0.49(0.46)
LassoJoint_BFGS_lambda.1se	0(0)	0.91(0.04)	0.95(0.04)	0.91(0.2)	0.41(0.26)
LassoJoint_BFGS_lambda.min	0.67(0.15)	0.54(0.41)	0.93(0.05)	0.5(0.42)	0.33(0.24)
LassoJoint_MM_(log(p)/n)^(1/2)	0(0)	0.86(0.05)	0.92(0.05)	0.94(0.03)	0.97(0.02)
LassoJoint_MM_lambda.1se	0(0)	0.85(0.06)	0.91(0.05)	0.94(0.04)	0.98(0.02)
LassoJoint_MM_lambda.min	0.44(0.12)	0.56(0.33)	0.84(0.1)	0.88(0.07)	0.98(0.02)
MIF5 Joint BFGS	0.77(0.31)	0.93(0.04)	0.95(0.03)	0.87(0.16)	0.23(0.39)
MIF5 Joint MM	0.59(0.23)	0.87(0.04)	0.93(0.03)	0.88(0.04)	0.95(0.02)

Table 120. Precision score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.56(0.09)	0.9(0.03)	0.99(0.02)	0.99(0.01)	0.99(0.01)
LassoJoint_BFGS_lambda.1se	0.59(0.12)	0.98(0.03)	0.99(0.01)	0.99(0.01)	0.99(0.02)
LassoJoint_BFGS_lambda.min	0.96(0.02)	0.99(0.01)	0.99(0.01)	0.99(0.01)	0.99(0.02)
LassoJoint_MM_(log(p)/n)^(1/2)	0.96(0.03)	0.92(0.02)	1(0.02)	1(0)	1(0)
LassoJoint_MM_lambda.1se	0.95(0.03)	0.98(0.04)	1(0)	1(0)	1(0)
LassoJoint_MM_lambda.min	1(0)	1(0)	1(0)	1(0)	1(0)
MIF5 Joint BFGS	0.99(0.02)	0.99(0.01)	0.99(0.01)	0.99(0.01)	0.99(0.01)
MIF5 Joint MM	1(0.01)	1(0)	1(0)	1(0)	1(0)

Table 121. Precision score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.89(0.06)	0.99(0.01)	0.95(0.04)	0.94(0.04)
LassoJoint_BFGS_lambda.1se	0.9(0.09)	0.89(0.07)	1(0.01)	0.95(0.04)	0.94(0.04)
LassoJoint_BFGS_lambda.min	0.93(0.06)	0.89(0.07)	1(0.01)	0.95(0.05)	0.95(0.04)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.94(0.04)	1(0.01)	0.96(0.04)	0.95(0.03)
LassoJoint_MM_lambda.1se	0.94(0.04)	0.95(0.04)	1(0.01)	0.96(0.03)	0.96(0.03)
LassoJoint_MM_lambda.min	0.98(0.03)	0.96(0.04)	1(0.01)	0.97(0.03)	0.95(0.04)
MIF5 Joint BFGS	0.94(0.08)	0.91(0.08)	0.9(0.07)	0.83(0.09)	0.89(0.1)
MIF5 Joint MM	0.97(0.07)	0.97(0.04)	0.95(0.05)	0.85(0.09)	0.88(0.09)

Table 122. Precision score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.95(0.03)	0.94(0.03)	0.94(0.03)	0.94(0.03)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.95(0.03)	0.94(0.03)	0.94(0.03)	0.94(0.04)
LassoJoint_BFGS_lambda.min	0.92(0.06)	0.89(0.07)	0.87(0.09)	0.91(0.05)	0.94(0.04)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.95(0.03)	0.94(0.03)	0.94(0.03)	0.94(0.03)
LassoJoint_MM_lambda.1se	NaN(NA)	0.95(0.03)	0.94(0.03)	0.94(0.03)	0.93(0.03)
LassoJoint_MM_lambda.min	0.93(0.07)	0.94(0.03)	0.91(0.04)	0.93(0.03)	0.91(0.04)
MIF5 Joint BFGS	0.85(0.09)	0.85(0.06)	0.9(0.04)	0.89(0.04)	0.91(0.04)
MIF5 Joint MM	0.93(0.04)	0.91(0.04)	0.91(0.05)	0.91(0.04)	0.91(0.04)

Table 123. Precision score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.7(0.03)	0.71(0.03)	0.79(0.06)	0.81(0.05)	0.8(0.03)
LassoJoint_BFGS_lambda.1se	0.7(0.03)	0.71(0.03)	0.8(0.05)	0.83(0.06)	0.83(0.03)
LassoJoint_BFGS_lambda.min	0.7(0.03)	0.8(0.05)	0.85(0.05)	0.82(0.05)	0.85(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.86(0.05)	0.86(0.05)	0.82(0.04)	0.8(0.03)
LassoJoint_MM_lambda.1se	NaN(NA)	NaN(NA)	0.83(0.05)	0.83(0.04)	0.83(0.03)
LassoJoint_MM_lambda.min	0.76(0.03)	0.83(0.04)	0.85(0.04)	0.82(0.04)	0.83(0.03)
MIF5 Joint BFGS	0.73(0.06)	0.83(0.07)	0.85(0.07)	0.76(0.04)	0.77(0.03)
MIF5 Joint MM	0.75(0.07)	0.89(0.06)	0.86(0.05)	0.77(0.04)	0.77(0.03)

Table 124. Precision score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.64(0.05)	0.58(0.09)	0.82(0.06)	0.78(0.05)	0.87(0.07)
LassoJoint_BFGS_lambda.1se	0.64(0.05)	0.61(0.14)	0.89(0.06)	0.92(0.03)	0.93(0.07)
LassoJoint_BFGS_lambda.min	0.73(0.1)	0.86(0.06)	0.87(0.06)	0.93(0.04)	0.95(0.1)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	NaN(NA)	0.83(0.06)	0.78(0.05)	0.87(0.06)
LassoJoint_MM_lambda.1se	NaN(NA)	0.74(0.02)	0.89(0.07)	0.92(0.06)	0.94(0.03)
LassoJoint_MM_lambda.min	0.71(0.17)	0.92(0.09)	0.9(0.05)	0.92(0.05)	0.96(0.02)
MIF5 Joint BFGS	0.66(0.18)	0.73(0.07)	0.77(0.05)	0.73(0.16)	0.7(0.11)
MIF5 Joint MM	0.67(0.29)	0.74(0.08)	0.77(0.04)	0.75(0.16)	0.73(0.1)

Table 125. Precision score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.76(0.04)	0.79(0.05)	0.81(0.1)	0.97(0.07)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.78(0.03)	0.79(0.05)	0.81(0.1)	0.96(0.09)
LassoJoint_BFGS_lambda.min	0.85(0.08)	0.78(0.04)	0.8(0.05)	0.84(0.11)	0.97(0.04)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.78(0.04)	0.8(0.05)	0.82(0.04)	0.79(0.04)
LassoJoint_MM_lambda.1se	NaN(NA)	0.77(0.05)	0.8(0.05)	0.82(0.05)	0.79(0.04)
LassoJoint_MM_lambda.min	0.87(0.05)	0.8(0.04)	0.81(0.05)	0.82(0.04)	0.8(0.04)
MIF5 Joint BFGS	0.73(0.04)	0.76(0.06)	0.77(0.04)	0.78(0.04)	1(0.01)
MIF5 Joint MM	0.82(0.05)	0.8(0.04)	0.78(0.04)	0.78(0.04)	0.79(0.03)

Table 126. Precision score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.61(0.01)	0.96(0.03)	0.92(0.04)	0.95(0.05)	0.94(0.04)
LassoJoint_BFGS_lambda.1se	0.88(0.11)	0.92(0.02)	0.93(0.03)	1(0.02)	0.96(0.03)
LassoJoint_BFGS_lambda.min	0.91(0.02)	0.91(0.01)	0.94(0.03)	0.98(0.07)	0.96(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.97(0.03)	0.92(0.02)	0.9(0.01)	0.91(0.01)
LassoJoint_MM_lambda.1se	0.97(0.03)	0.94(0.01)	0.94(0.01)	0.91(0.01)	0.92(0.01)
LassoJoint_MM_lambda.min	0.95(0.02)	0.95(0.01)	0.95(0.01)	0.92(0.01)	0.92(0.01)
MIF5 Joint BFGS	0.94(0.04)	NaN(NA)	NaN(NA)	NaN(NA)	NaN(NA)
MIF5 Joint MM	0.94(0.07)	NaN(NA)	NaN(NA)	0.85(0.04)	0.8(0.03)

Table 127. Precision score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.68(0.07)	0.99(0.02)	0.97(0.03)	0.98(0.02)	0.98(0.02)
LassoJoint_BFGS_lambda.1se	0.68(0.07)	0.98(0.02)	0.98(0.02)	0.98(0.02)	0.97(0.02)
LassoJoint_BFGS_lambda.min	0.92(0.07)	0.98(0.02)	0.96(0.04)	0.97(0.03)	0.97(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.98(0.02)	0.98(0.02)	0.98(0.02)	0.98(0.02)
LassoJoint_MM_lambda.1se	NaN(NA)	0.98(0.02)	0.99(0.02)	0.98(0.02)	0.97(0.02)
LassoJoint_MM_lambda.min	0.96(0.07)	0.98(0.03)	0.98(0.02)	0.98(0.02)	0.97(0.03)

Table 128. Precision score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.96(0.03)	0.94(0.03)	0.94(0.03)	0.97(0.03)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.97(0.03)	0.96(0.02)	0.95(0.03)	0.99(0.02)
LassoJoint_BFGS_lambda.min	0.95(0.05)	0.99(0.02)	0.96(0.02)	0.98(0.03)	0.99(0.01)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.98(0.02)	0.96(0.02)	0.97(0.02)	0.96(0.02)
LassoJoint_MM_lambda.1se	NaN(NA)	0.99(0.02)	0.97(0.02)	0.97(0.02)	0.97(0.02)
LassoJoint_MM_lambda.min	0.98(0.03)	0.99(0.01)	0.97(0.02)	0.97(0.02)	0.97(0.02)
MIF5 Joint BFGS	0.94(0.04)	0.95(0.03)	0.95(0.02)	0.98(0.02)	0.99(0.02)
MIF5 Joint MM	0.98(0.03)	0.96(0.03)	0.97(0.02)	0.98(0.02)	0.96(0.02)

Table 129. F1 score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.71(0.05)	0.88(0.03)	0.99(0.02)	0.99(0)	0.98(0.05)
LassoJoint_BFGS_lambda.1se	0.72(0.06)	0.99(0.03)	0.99(0.01)	0.99(0)	0.98(0.06)
LassoJoint_BFGS_lambda.min	0.98(0.02)	0.99(0)	0.99(0.01)	0.99(0)	0.98(0.06)
LassoJoint_MM_(log(p)/n)^(1/2)	0.81(0.02)	0.86(0.02)	0.99(0.02)	0.99(0.01)	1(0)
LassoJoint_MM_lambda.1se	0.83(0.03)	0.95(0.05)	0.99(0.01)	0.99(0.01)	1(0)
LassoJoint_MM_lambda.min	0.97(0.01)	0.98(0.01)	0.99(0)	0.99(0.01)	1(0)
MIF5 Joint BFGS	0.99(0.02)	0.99(0)	0.99(0)	0.99(0)	0.94(0.1)
MIF5 Joint MM	0.95(0.04)	0.98(0.01)	0.99(0.01)	0.99(0)	1(0)

Table 130. F1 score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.9(0.04)	0.87(0.08)	0.95(0.03)	0.94(0.02)
LassoJoint_BFGS_lambda.1se	0.76(0.06)	0.9(0.04)	0.86(0.14)	0.94(0.03)	0.92(0.1)
LassoJoint_BFGS_lambda.min	0.89(0.06)	0.91(0.04)	0.87(0.1)	0.94(0.03)	0.94(0.04)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.91(0.04)	0.86(0.11)	0.95(0.02)	0.94(0.02)
LassoJoint_MM_lambda.1se	0.81(0.05)	0.92(0.03)	0.85(0.12)	0.95(0.02)	0.94(0.02)
LassoJoint_MM_lambda.min	0.88(0.05)	0.92(0.03)	0.85(0.13)	0.95(0.02)	0.94(0.02)
MIF5 Joint BFGS	0.68(0.13)	0.86(0.06)	0.87(0.09)	0.84(0.06)	0.69(0.26)
MIF5 Joint MM	0.67(0.15)	0.83(0.08)	0.87(0.12)	0.84(0.06)	0.84(0.07)

Table 131. F1 score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.88(0.04)	0.86(0.02)	0.86(0.03)	0.86(0.03)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.88(0.04)	0.86(0.02)	0.86(0.03)	0.67(0.23)
LassoJoint_BFGS_lambda.min	0.66(0.22)	0.85(0.03)	0.81(0.18)	0.78(0.18)	0.56(0.22)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.87(0.03)	0.86(0.02)	0.86(0.03)	0.86(0.03)
LassoJoint_MM_lambda.1se	NaN(NA)	0.87(0.03)	0.86(0.02)	0.86(0.03)	0.86(0.03)
LassoJoint_MM_lambda.min	0.6(0.29)	0.84(0.07)	0.85(0.03)	0.86(0.04)	0.87(0.03)
MIF5 Joint BFGS	0.76(0.22)	0.84(0.04)	0.82(0.04)	0.84(0.04)	0.83(0.05)
MIF5 Joint MM	0.79(0.17)	0.82(0.04)	0.82(0.05)	0.83(0.04)	0.83(0.04)

Table 132. F1 score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.82(0.02)	0.83(0.02)	0.75(0.06)	0.73(0.12)	0.81(0.04)
LassoJoint_BFGS_lambda.1se	0.82(0.02)	0.83(0.02)	0.77(0.05)	0.73(0.17)	0.8(0.03)
LassoJoint_BFGS_lambda.min	0.81(0.08)	0.81(0.04)	0.72(0.14)	0.8(0.05)	0.8(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.64(0.04)	0.69(0.05)	0.74(0.06)	0.82(0.02)
LassoJoint_MM_lambda.1se	NaN(NA)	NaN(NA)	0.74(0.09)	0.77(0.06)	0.82(0.02)
LassoJoint_MM_lambda.min	0.51(0.21)	0.75(0.11)	0.73(0.07)	0.8(0.04)	0.82(0.02)
MIF5 Joint BFGS	0.72(0.17)	0.66(0.23)	0.63(0.22)	0.82(0.03)	0.83(0.02)
MIF5 Joint MM	0.59(0.14)	0.52(0.23)	0.61(0.16)	0.81(0.03)	0.83(0.02)

Table 133. F1 score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.78(0.04)	0.73(0.07)	0.75(0.1)	0.83(0.02)	0.88(0.03)
LassoJoint_BFGS_lambda.1se	0.78(0.04)	0.72(0.07)	0.87(0.01)	0.76(0.11)	0.9(0.05)
LassoJoint_BFGS_lambda.min	0.38(0.31)	0.74(0.03)	0.85(0.05)	0.72(0.11)	0.85(0.1)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	NaN(NA)	0.74(0.1)	0.83(0.03)	0.89(0.03)
LassoJoint_MM_lambda.1se	NaN(NA)	0.66(0.08)	0.83(0.05)	0.87(0.03)	0.91(0.01)
LassoJoint_MM_lambda.min	0.31(0.36)	0.62(0.07)	0.83(0.04)	0.86(0.04)	0.89(0.04)
MIF5 Joint BFGS	0.49(0.33)	0.8(0.07)	0.83(0.05)	0.8(0.14)	0.81(0.07)
MIF5 Joint MM	0.47(0.35)	0.79(0.06)	0.79(0.04)	0.81(0.13)	0.83(0.07)

Table 134. F1 score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.81(0.03)	0.83(0.03)	0.6(0.34)	0.12(0.28)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.81(0.03)	0.83(0.03)	0.6(0.34)	0.15(0.3)
LassoJoint_BFGS_lambda.min	0.59(0.18)	0.82(0.03)	0.82(0.03)	0.47(0.37)	0.19(0.22)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.8(0.03)	0.83(0.03)	0.81(0.03)	0.83(0.03)
LassoJoint_MM_lambda.1se	NaN(NA)	0.79(0.03)	0.83(0.03)	0.81(0.03)	0.83(0.03)
LassoJoint_MM_lambda.min	0.6(0.12)	0.8(0.03)	0.82(0.03)	0.8(0.03)	0.83(0.03)
MIF5 Joint BFGS	0.81(0.03)	0.81(0.06)	0.82(0.02)	0.83(0.02)	0.03(0.07)
MIF5 Joint MM	0.74(0.1)	0.81(0.04)	0.82(0.02)	0.83(0.02)	0.82(0.03)

Table 135. F1 score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.76(0.01)	0.53(0.35)	0.79(0.3)	0.51(0.46)	0.73(0.31)
LassoJoint_BFGS_lambda.1se	0.76(0.15)	0.87(0.15)	0.84(0.25)	0.04(0.13)	0.58(0.4)
LassoJoint_BFGS_lambda.min	0.84(0.03)	0.9(0.01)	0.85(0.23)	0.04(0.13)	0.62(0.41)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.51(0.27)	0.88(0.07)	0.91(0.01)	0.92(0.01)
LassoJoint_MM_lambda.1se	0.4(0.25)	0.85(0.07)	0.91(0.01)	0.92(0.01)	0.93(0.01)
LassoJoint_MM_lambda.min	0.55(0.09)	0.86(0.03)	0.9(0.01)	0.92(0.01)	0.93(0.01)
MIF5 Joint BFGS	0.42(0.28)	NaN(NA)	NaN(NA)	NaN(NA)	NaN(NA)
MIF5 Joint MM	0.23(0.11)	NaN(NA)	NaN(NA)	0.75(0.04)	0.84(0.02)

Table 136. F1 score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	0.81(0.05)	0.96(0.02)	0.94(0.03)	0.95(0.03)	0.95(0.02)
LassoJoint_BFGS_lambda.1se	0.81(0.05)	0.96(0.02)	0.94(0.03)	0.95(0.03)	0.95(0.02)
LassoJoint_BFGS_lambda.min	0.81(0.15)	0.88(0.08)	0.92(0.04)	0.94(0.02)	0.93(0.03)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.96(0.02)	0.93(0.03)	0.95(0.03)	0.95(0.02)
LassoJoint_MM_lambda.1se	NaN(NA)	0.94(0.09)	0.94(0.03)	0.95(0.03)	0.95(0.02)
LassoJoint_MM_lambda.min	0.6(0.27)	0.65(0.25)	0.91(0.05)	0.94(0.03)	0.94(0.03)

Table 137. F1 score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	NaN(NA)	0.94(0.02)	0.94(0.02)	0.95(0.02)	0.77(0.35)
LassoJoint_BFGS_lambda.1se	NaN(NA)	0.94(0.02)	0.95(0.02)	0.91(0.17)	0.68(0.12)
LassoJoint_BFGS_lambda.min	0.78(0.12)	0.6(0.41)	0.94(0.02)	0.55(0.38)	0.6(0.17)
LassoJoint_MM_(log(p)/n)^(1/2)	NaN(NA)	0.92(0.03)	0.94(0.02)	0.95(0.02)	0.96(0.02)
LassoJoint_MM_lambda.1se	NaN(NA)	0.91(0.04)	0.94(0.02)	0.95(0.02)	0.97(0.01)
LassoJoint_MM_lambda.min	0.59(0.13)	0.65(0.34)	0.9(0.06)	0.92(0.04)	0.97(0.01)
MIF5 Joint BFGS	0.86(0.2)	0.94(0.02)	0.95(0.02)	0.91(0.13)	0.45(0.44)
MIF5 Joint MM	0.71(0.21)	0.91(0.03)	0.95(0.02)	0.93(0.02)	0.96(0.02)

Table 138. Method avg.rank based on Accuracy metrics

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_lambda.1se	4.20	3.83	3.31	4.54	4.46
LassoJoint_MM_lambda.min	3.70	3.67	5.46	4.31	3.54
MIF5 Joint MM	3.78	4.36	4.75	4.25	4.25
MIF5 Joint BFGS	2.56	3.64	4.42	4.75	6.58
LassoJoint_BFGS_(log(p)/n)^(1/2)	4.20	4.83	4.00	3.85	5.15
LassoJoint_BFGS_lambda.min	2.40	3.75	4.38	5.69	6.08
LassoJoint_MM_lambda.1se	7.10	4.83	4.23	3.85	2.38
LassoJoint_MM_(log(p)/n)^(1/2)	7.20	5.50	5.00	4.31	3.23

Table 139. Method avg.rank based on Recall metrics

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	3.10	3.75	3.31	2.85	4.15
LassoJoint_BFGS_lambda.1se	3.90	3.08	3.08	4.46	5.15
MIF5 Joint BFGS	2.89	3.36	3.83	4.42	5.75
MIF5 Joint MM	4.11	5.00	5.08	3.67	3.75
LassoJoint_BFGS_lambda.min	2.70	3.75	4.23	6.23	6.46
LassoJoint_MM_lambda.min	4.20	4.58	5.54	5.00	4.31
LassoJoint_MM_lambda.1se	7.10	5.33	5.00	4.31	3.23
LassoJoint_MM_(log(p)/n)^(1/2)	7.20	5.58	5.46	4.54	2.77

Table 140. Method avg.rank based on Precision metrics

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_MM_lambda.min	1.20	2.67	3.00	4.23	4.92
LassoJoint_BFGS_lambda.min	3.50	4.17	4.31	3.31	2.92
LassoJoint_MM_lambda.1se	5.80	4.08	3.00	3.69	3.85
LassoJoint_BFGS_lambda.1se	5.80	4.58	4.31	3.38	3.00
MIF5 Joint MM	2.56	3.55	4.92	5.67	6.83
LassoJoint_BFGS_(log(p)/n)^(1/2)	5.60	5.25	5.62	4.62	3.77
LassoJoint_MM_(log(p)/n)^(1/2)	6.90	4.83	4.31	4.54	5.00
MIF5 Joint BFGS	3.78	5.36	6.25	6.33	5.50

Table 141. Method avg.rank based on F1 metrics

method	0.1	0.3	0.5	0.7	0.9
LassoJoint_BFGS_(log(p)/n)^(1/2)	3.80	3.00	2.54	3.00	4.38
LassoJoint_BFGS_lambda.1se	4.20	2.50	2.62	4.85	4.69
LassoJoint_MM_lambda.1se	6.70	5.25	4.08	3.46	2.85
LassoJoint_BFGS_lambda.min	2.50	3.42	4.69	6.31	5.62
MIF5 Joint BFGS	2.67	4.09	4.50	5.08	6.33
LassoJoint_MM_lambda.min	4.10	4.92	5.85	4.46	4.08
MIF5 Joint MM	4.22	5.64	5.83	4.17	4.33
LassoJoint_MM_(log(p)/n)^(1/2)	7.00	5.75	5.54	4.23	3.38