Supplemental materials to the paper 'Classification methods and their accuracy in learning from positive and unlabeled data problems'

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Accuracy

Table 1. Accuracy on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.86	0.84	0.94	0.99	0.99
AdaS_svm	0.90	0.89	0.97	0.98	1.00
Joint BFGS	1.00	1.00	0.99	1.00	0.99
Joint MM	0.98	0.98	0.98	0.99	0.99
LassoJoint_BFGS	1.00	1.00	0.99	1.00	0.99
LassoJoint_BFGS_lambda.1se	0.65	1.00	0.99	1.00	0.99
LassoJoint_BFGS_lambda.min	1.00	1.00	0.99	1.00	0.99
LassoJoint_MM	0.98	0.98	0.98	0.99	0.99
LassoJoint_MM_lambda.1se	0.72	0.98	0.98	0.99	0.99
LassoJoint_MM_lambda.min	0.98	0.98	0.98	0.99	0.99
Naive	0.45	0.47	0.68	0.94	0.99
Oracle	1.00	1.00	1.00	1.00	1.00
Weighted BFGS	0.97	0.96	0.97	0.99	0.99

Table 2. Accuracy on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.77	0.85	0.97	0.96	0.90
AdaS_svm	0.83	0.88	0.91	0.95	0.91
Joint BFGS	0.78	0.91	0.98	0.94	0.79
Joint MM	0.86	0.85	0.98	0.95	0.90
LassoJoint_BFGS	0.79	0.93	0.98	0.94	0.90
LassoJoint_BFGS_lambda.1se	0.70	0.93	0.97	0.95	0.77
LassoJoint_BFGS_lambda.min	0.90	0.93	0.98	0.94	0.90
LassoJoint_MM	0.86	0.85	0.97	0.95	0.90
LassoJoint_MM_lambda.1se	0.75	0.90	0.96	0.95	0.90
LassoJoint_MM_lambda.min	0.89	0.88	0.97	0.95	0.90
Naive	0.54	0.50	0.75	0.95	0.91
Oracle	0.96	0.96	0.96	0.96	0.96
Weighted BFGS	0.72	0.90	0.97	0.95	0.79

Table 3. Accuracy on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.62	0.74	0.78	0.76	0.84
AdaS_svm	0.51	0.76	0.84	0.86	0.88
Joint BFGS	0.46	0.45	0.61	0.82	0.61
Joint MM	0.56	0.52	0.82	0.83	0.90
LassoJoint_BFGS	0.74	0.83	0.61	0.83	0.76
LassoJoint_BFGS_lambda.1se	0.46	0.83	0.48	0.85	0.83
LassoJoint_BFGS_lambda.min	0.82	0.76	0.68	0.84	0.78
LassoJoint_MM	0.55	0.57	0.82	0.84	0.90
LassoJoint_MM_lambda.1se	0.46	0.74	0.87	0.84	0.90
LassoJoint_MM_lambda.min	0.62	0.76	0.86	0.85	0.90
Naive	0.46	0.51	0.64	0.73	0.90
Oracle	0.92	0.92	0.92	0.92	0.92
Weighted BFGS	0.46	0.45	0.59	0.83	0.70

Table 4. Accuracy on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.59	0.52	0.58	0.58	0.64
AdaS_svm	0.53	0.52	0.60	0.65	0.65
Joint BFGS	0.62	0.66	0.71	0.70	0.71
Joint MM	0.60	0.65	0.72	0.66	0.73
LassoJoint_BFGS	0.63	0.65	0.63	0.69	0.70
LassoJoint_BFGS_lambda.1se	0.68	0.45	0.45	0.34	0.73
LassoJoint_BFGS_lambda.min	0.44	0.48	0.58	0.60	0.71
LassoJoint_MM	0.58	0.65	0.69	0.67	0.74
LassoJoint_MM_lambda.1se	0.32	0.32	0.64	0.60	0.74
LassoJoint_MM_lambda.min	0.43	0.61	0.69	0.61	0.73
Naive	0.32	0.32	0.43	0.66	0.73
Oracle	0.79	0.79	0.79	0.79	0.79
Weighted BFGS	0.67	0.71	0.73	0.69	0.73

Table 5. Accuracy on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.59	0.56	0.69	0.74	0.77
AdaS_svm	0.36	0.38	0.69	0.83	0.77
Joint BFGS	0.52	0.47	0.63	0.76	0.78
Joint MM	0.47	0.51	0.60	0.65	0.69
LassoJoint_BFGS	0.52	0.41	0.71	0.74	0.77
LassoJoint_BFGS_lambda.1se	0.52	0.72	0.78	0.92	0.91
LassoJoint_BFGS_lambda.min	0.56	0.56	0.73	0.78	0.80
LassoJoint_MM	0.46	0.43	0.61	0.75	0.80
LassoJoint_MM_lambda.1se	0.40	0.64	0.82	0.91	0.86
LassoJoint_MM_lambda.min	0.49	0.53	0.77	0.84	0.78
Naive	0.49	0.50	0.64	0.73	0.77
Oracle	0.92	0.92	0.92	0.92	0.92
Weighted BFGS	0.52	0.54	0.67	0.70	0.77

Table 6. Accuracy on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.52	0.67	0.68	0.71	0.72
AdaS_svm	0.47	0.64	0.64	0.71	0.71
Joint BFGS	0.76	0.71	0.78	0.75	0.57
Joint MM	0.74	0.70	0.78	0.75	0.76
LassoJoint_BFGS	0.75	0.71	0.78	0.75	0.54
LassoJoint_BFGS_lambda.1se	0.37	0.32	0.75	0.72	0.74
LassoJoint_BFGS_lambda.min	0.74	0.69	0.79	0.75	0.54
LassoJoint_MM	0.73	0.70	0.78	0.75	0.76
LassoJoint_MM_lambda.1se	0.37	0.70	0.76	0.72	0.74
LassoJoint_MM_lambda.min	0.73	0.68	0.79	0.75	0.76
Naive	0.37	0.32	0.34	0.68	0.77
Oracle	0.80	0.80	0.80	0.80	0.80
Weighted BFGS	0.73	0.71	0.79	0.77	0.61

Table 7. Accuracy on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.62	0.77	0.81	0.86	0.87
AdaS_svm	0.61	0.79	0.83	0.90	0.93
Joint BFGS	0.83	0.90	0.82	0.41	0.39
Joint MM	0.64	0.85	0.89	0.93	0.92
LassoJoint_BFGS	0.83	0.89	0.81	0.41	0.66
LassoJoint_BFGS_lambda.1se	0.40	0.90	0.82	0.41	0.89
LassoJoint_BFGS_lambda.min	0.79	0.90	0.90	0.41	0.66
LassoJoint_MM	0.63	0.86	0.89	0.93	0.92
LassoJoint_MM_lambda.1se	0.51	0.85	0.89	0.93	0.92
LassoJoint_MM_lambda.min	0.59	0.85	0.88	0.93	0.92
Naive	0.40	0.40	0.55	0.90	0.91
Oracle	0.94	0.94	0.94	0.94	0.94
Weighted BFGS	0.80	0.88	0.80	0.45	0.45

Table 8. Accuracy on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.81	0.87	0.84	0.93	0.88
AdaS_svm	0.72	0.78	0.81	0.94	0.91
Joint BFGS	0.69	0.57	0.77	0.86	0.90
Joint MM	0.51	0.56	0.80	0.90	0.89
LassoJoint_BFGS	0.67	0.66	0.76	0.86	0.90
LassoJoint_BFGS_lambda.1se	0.66	0.67	0.86	0.94	0.91
LassoJoint_BFGS_lambda.min	0.75	0.61	0.82	0.96	0.92
LassoJoint_MM	0.52	0.53	0.79	0.88	0.91
LassoJoint_MM_lambda.1se	0.62	0.81	0.87	0.96	0.91
LassoJoint_MM_lambda.min	0.64	0.53	0.84	0.91	0.93
Naive	0.39	0.46	0.61	0.78	0.87
Oracle	0.96	0.96	0.96	0.96	0.96
Weighted BFGS	0.66	0.57	0.74	0.88	0.87

Table 9. Accuracy on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.72	0.85	0.85	0.95	0.97
AdaS_svm	0.82	0.87	0.82	0.93	0.99
Joint BFGS	0.39	0.87	0.71	0.42	0.53
Joint MM	0.38	0.77	0.83	0.94	0.95
LassoJoint_BFGS	0.41	0.89	0.85	0.50	0.54
LassoJoint_BFGS_lambda.1se	0.38	0.92	0.91	0.82	0.47
LassoJoint_BFGS_lambda.min	0.74	0.95	0.86	0.82	0.45
LassoJoint_MM	0.39	0.81	0.84	0.96	0.96
LassoJoint_MM_lambda.1se	0.38	0.93	0.87	0.97	0.97
LassoJoint_MM_lambda.min	0.40	0.92	0.85	0.96	0.97
Naive	0.39	0.42	0.57	0.90	0.96
Oracle	0.97	0.97	0.97	0.97	0.97
Weighted BFGS	0.38	0.81	0.69	0.49	0.77

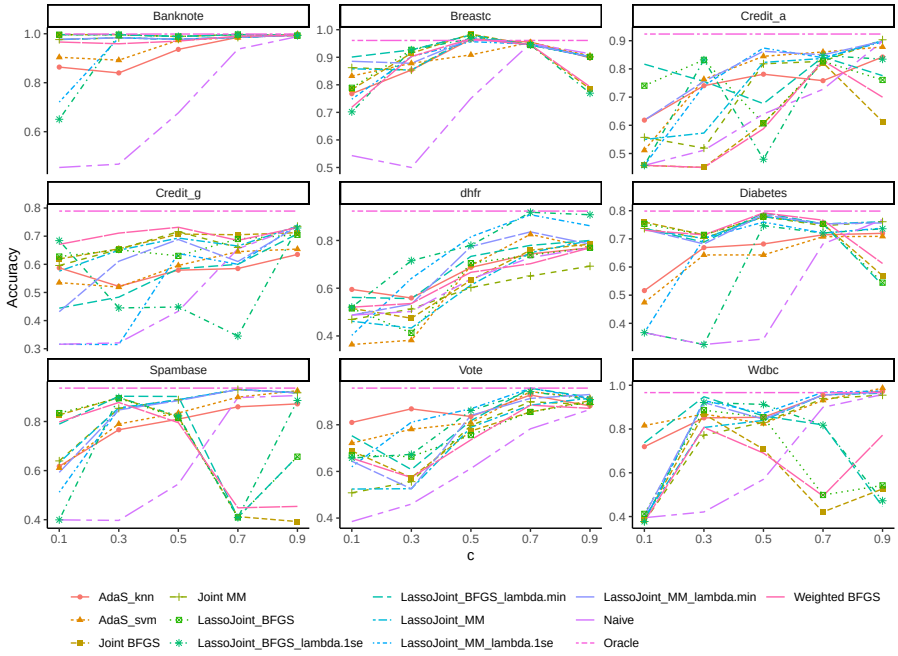

Fig. 1. The accuracy measure on test datasets

Recall

Table 10. Recall on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.75	0.70	0.88	0.97	0.99
AdaS_svm	0.82	0.80	0.95	0.97	1.00
Joint BFGS	1.00	1.00	0.98	1.00	1.00
Joint MM	0.96	0.97	0.96	0.97	0.99
LassoJoint_BFGS	1.00	1.00	0.98	1.00	1.00
LassoJoint_BFGS_lambda.1se	0.95	1.00	0.98	1.00	1.00
LassoJoint_BFGS_lambda.min	1.00	1.00	0.98	1.00	1.00
LassoJoint_MM	0.96	0.97	0.96	0.97	0.99
LassoJoint_MM_lambda.1se	0.49	0.97	0.96	0.97	0.99
LassoJoint_MM_lambda.min	0.96	0.97	0.96	0.97	0.99
Naive	0.00	0.00	0.40	0.88	0.98
Oracle	1.00	1.00	1.00	1.00	1.00
Weighted BFGS	0.98	0.98	0.97	0.99	1.00

Table 11. Recall on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.56	0.76	0.92	0.94	0.88
AdaS_svm	0.64	0.76	0.79	0.91	0.87
Joint BFGS	0.56	0.83	0.96	0.96	0.56
Joint MM	0.73	0.71	0.94	0.95	0.87
LassoJoint_BFGS	0.55	0.85	0.96	0.96	0.87
LassoJoint_BFGS_lambda.1se	0.41	0.85	0.93	0.95	0.58
LassoJoint_BFGS_lambda.min	0.84	0.85	0.96	0.96	0.87
LassoJoint_MM	0.73	0.71	0.93	0.95	0.87
LassoJoint_MM_lambda.1se	0.49	0.80	0.90	0.95	0.87
LassoJoint_MM_lambda.min	0.77	0.76	0.92	0.95	0.87
Naive	0.00	0.00	0.43	0.89	0.84
Oracle	0.97	0.97	0.97	0.97	0.97
Weighted BFGS	0.48	0.85	0.93	0.94	0.58

Table 12. Recall on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.34	0.66	0.75	0.71	0.87
AdaS_svm	0.15	0.65	0.76	0.77	0.83
Joint BFGS	0.00	0.00	0.32	0.86	0.28
Joint MM	0.23	0.14	0.80	0.81	0.91
LassoJoint_BFGS	0.62	0.87	0.31	0.86	0.57
LassoJoint_BFGS_lambda.1se	0.00	0.76	0.00	0.85	0.79
LassoJoint_BFGS_lambda.min	0.93	0.61	0.42	0.86	0.60
LassoJoint_MM	0.23	0.24	0.81	0.80	0.91
LassoJoint_MM_lambda.1se	0.00	0.59	0.82	0.80	0.84
LassoJoint_MM_lambda.min	0.32	0.61	0.83	0.82	0.89
Naive	0.00	0.11	0.35	0.52	0.89
Oracle	0.92	0.92	0.92	0.92	0.92
Weighted BFGS	0.00	0.00	0.29	0.86	0.45

Table 13. Recall on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.56	0.44	0.54	0.58	0.64
AdaS_svm	0.39	0.36	0.46	0.61	0.64
Joint BFGS	0.65	0.75	0.89	0.77	0.75
Joint MM	0.46	0.64	0.78	0.65	0.80
LassoJoint_BFGS	0.68	0.72	0.73	0.74	0.73
LassoJoint_BFGS_lambda.1se	1.00	0.33	0.29	0.08	0.78
LassoJoint_BFGS_lambda.min	0.21	0.34	0.55	0.53	0.75
LassoJoint_MM	0.43	0.64	0.74	0.65	0.80
LassoJoint_MM_lambda.1se	0.00	0.00	0.56	0.56	0.81
LassoJoint_MM_lambda.min	0.19	0.57	0.71	0.58	0.80
Naive	0.00	0.01	0.19	0.61	0.79
Oracle	0.91	0.91	0.91	0.91	0.91
Weighted BFGS	0.68	0.78	0.87	0.75	0.78

Table 14. Recall on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.73	0.51	0.79	0.83	0.88
AdaS_svm	0.04	0.12	0.63	0.79	0.74
Joint BFGS	0.24	0.21	0.48	0.67	0.74
Joint MM	0.30	0.39	0.53	0.65	0.62
LassoJoint_BFGS	0.20	0.11	0.63	0.67	0.76
LassoJoint_BFGS_lambda.1se	0.67	0.77	0.75	0.94	0.88
LassoJoint_BFGS_lambda.min	0.33	0.36	0.68	0.71	0.76
LassoJoint_MM	0.10	0.15	0.44	0.67	0.74
LassoJoint_MM_lambda.1se	0.00	0.56	0.80	0.93	0.83
LassoJoint_MM_lambda.min	0.14	0.32	0.72	0.82	0.71
Naive	0.18	0.26	0.49	0.65	0.71
Oracle	0.93	0.93	0.93	0.93	0.93
Weighted BFGS	0.23	0.31	0.55	0.61	0.74

Table 15. Recall on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.48	0.60	0.61	0.69	0.75
AdaS_svm	0.20	0.52	0.55	0.67	0.70
Joint BFGS	0.89	0.71	0.92	0.83	0.36
Joint MM	0.78	0.68	0.89	0.82	0.89
LassoJoint_BFGS	0.92	0.71	0.92	0.83	0.32
LassoJoint_BFGS_lambda.1se	0.00	0.00	0.92	0.91	0.89
LassoJoint_BFGS_lambda.min	0.94	0.68	0.91	0.83	0.30
LassoJoint_MM	0.79	0.68	0.89	0.82	0.89
LassoJoint_MM_lambda.1se	0.00	0.73	0.92	0.91	0.89
LassoJoint_MM_lambda.min	0.78	0.65	0.87	0.82	0.89
Naive	0.00	0.00	0.08	0.58	0.83
Oracle	0.91	0.91	0.91	0.91	0.91
Weighted BFGS	0.92	0.72	0.92	0.86	0.44

Table 16. Recall on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.46	0.73	0.79	0.83	0.90
AdaS_svm	0.38	0.70	0.78	0.86	0.93
Joint BFGS	0.84	0.91	0.78	0.02	0.00
Joint MM	0.43	0.80	0.89	0.93	0.94
LassoJoint_BFGS	0.85	0.92	0.77	0.01	0.47
LassoJoint_BFGS_lambda.1se	0.00	0.93	0.79	0.01	0.87
LassoJoint_BFGS_lambda.min	0.72	0.93	0.93	0.01	0.48
LassoJoint_MM	0.42	0.80	0.89	0.93	0.94
LassoJoint_MM_lambda.1se	0.23	0.80	0.89	0.93	0.95
LassoJoint_MM_lambda.min	0.35	0.79	0.88	0.93	0.94
Naive	0.00	0.02	0.28	0.85	0.92
Oracle	0.96	0.96	0.96	0.96	0.96
Weighted BFGS	0.81	0.90	0.76	0.08	0.11

Table 17. Recall on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.72	0.81	0.75	0.90	0.85
AdaS_svm	0.57	0.66	0.71	0.90	0.89
Joint BFGS	0.53	0.35	0.73	0.88	0.87
Joint MM	0.24	0.33	0.74	0.86	0.85
LassoJoint_BFGS	0.49	0.49	0.73	0.86	0.85
LassoJoint_BFGS_lambda.1se	0.79	0.50	0.83	0.90	0.88
LassoJoint_BFGS_lambda.min	0.62	0.41	0.80	0.95	0.90
LassoJoint_MM	0.26	0.26	0.72	0.83	0.88
LassoJoint_MM_lambda.1se	0.42	0.71	0.82	0.95	0.89
LassoJoint_MM_lambda.min	0.43	0.27	0.79	0.88	0.89
Naive	0.04	0.17	0.43	0.64	0.81
Oracle	0.95	0.95	0.95	0.95	0.95
Weighted BFGS	0.48	0.38	0.72	0.83	0.81

Table 18. Recall on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.59	0.79	0.77	0.95	0.97
AdaS_svm	0.73	0.79	0.71	0.89	0.99
Joint BFGS	0.03	0.83	0.53	0.03	0.24
Joint MM	0.01	0.70	0.73	0.91	0.96
LassoJoint_BFGS	0.07	0.86	0.80	0.16	0.27
LassoJoint_BFGS_lambda.1se	0.00	0.99	0.87	0.71	0.17
LassoJoint_BFGS_lambda.min	0.65	0.96	0.81	0.70	0.13
LassoJoint_MM	0.04	0.73	0.75	0.93	0.97
LassoJoint_MM_lambda.1se	0.00	0.90	0.79	0.96	0.98
LassoJoint_MM_lambda.min	0.06	0.90	0.75	0.93	0.97
Naive	0.04	0.07	0.29	0.84	0.96
Oracle	1.00	1.00	1.00	1.00	1.00
Weighted BFGS	0.01	0.74	0.51	0.16	0.64

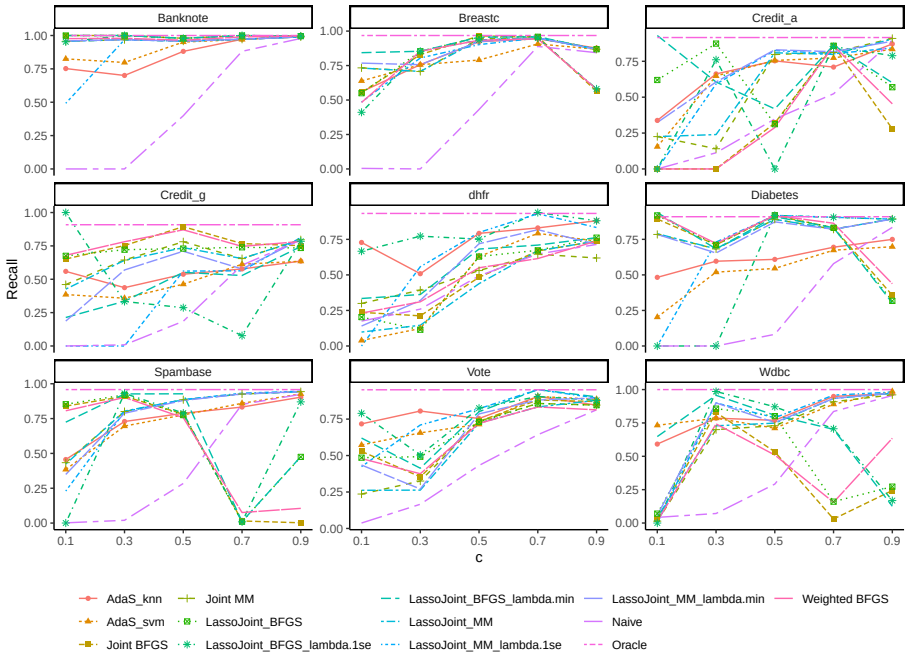

Fig. 2. The recall measure on test datasets

Precision

Table 19. Precision on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	1.00	1.00	1.00	1.00	1.00
AdaS_svm	1.00	1.00	1.00	1.00	1.00
Joint BFGS	0.99	0.99	1.00	0.99	0.99
Joint MM	1.00	1.00	1.00	1.00	1.00
LassoJoint_BFGS	0.99	0.99	1.00	0.99	0.99
LassoJoint_BFGS_lambda.1se	0.66	0.99	1.00	0.99	0.99
LassoJoint_BFGS_lambda.min	0.99	0.99	1.00	0.99	0.99
LassoJoint_MM	1.00	1.00	1.00	1.00	1.00
LassoJoint_MM_lambda.1se	0.97	1.00	1.00	1.00	1.00
LassoJoint_MM_lambda.min	1.00	1.00	1.00	1.00	1.00
Naive			1.00	1.00	1.00
Oracle	1.00	1.00	1.00	1.00	1.00
Weighted BFGS	0.96	0.95	0.98	0.99	0.99

Table 20. Precision on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.88	0.94	1.00	0.96	0.90
AdaS_svm	1.00	1.00	1.00	0.99	0.92
Joint BFGS	0.96	1.00	1.00	0.92	0.91
Joint MM	0.96	1.00	1.00	0.93	0.91
LassoJoint_BFGS	0.98	1.00	1.00	0.92	0.91
LassoJoint_BFGS_lambda.1se	0.91	1.00	0.99	0.93	0.90
LassoJoint_BFGS_lambda.min	0.93	1.00	1.00	0.92	0.91
LassoJoint_MM	0.94	1.00	1.00	0.93	0.91
LassoJoint_MM_lambda.1se	0.96	1.00	1.00	0.94	0.92
LassoJoint_MM_lambda.min	0.98	1.00	1.00	0.93	0.91
Naive	1.00		1.00	1.00	0.96
Oracle	0.97	0.97	0.97	0.97	0.97
Weighted BFGS	0.84	0.95	0.99	0.94	0.92

Table 21. Precision on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.89	0.82	0.82	0.83	0.84
AdaS_svm	0.73	0.88	0.93	0.96	0.93
Joint BFGS		0.00	0.86	0.82	0.99
Joint MM	0.84	0.83	0.84	0.86	0.91
LassoJoint_BFGS	0.86	0.83	0.92	0.83	0.98
LassoJoint_BFGS_lambda.1se		0.92		0.87	0.91
LassoJoint_BFGS_lambda.min	0.78	0.91	0.92	0.85	0.98
LassoJoint_MM	0.80	0.89	0.84	0.90	0.91
LassoJoint_MM_lambda.1se		0.89	0.93	0.89	0.96
LassoJoint_MM_lambda.min	0.92	0.91	0.90	0.90	0.92
Naive		0.89	0.90	0.95	0.92
Oracle	0.94	0.94	0.94	0.94	0.94
Weighted BFGS		0.00	0.88	0.83	0.97

Table 22. Precision on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.77	0.77	0.78	0.78	0.81
AdaS_svm	0.85	0.86	0.90	0.84	0.84
Joint BFGS	0.76	0.75	0.74	0.81	0.83
Joint MM	0.90	0.81	0.80	0.83	0.83
LassoJoint_BFGS	0.76	0.76	0.73	0.81	0.83
LassoJoint_BFGS_lambda.1se	0.68	0.70	0.76	1.00	0.83
LassoJoint_BFGS_lambda.min	0.91	0.79	0.83	0.85	0.83
LassoJoint_MM	0.91	0.81	0.81	0.84	0.83
LassoJoint_MM_lambda.1se			0.87	0.82	0.82
LassoJoint_MM_lambda.min	0.91	0.83	0.82	0.82	0.83
Naive		1.00	0.94	0.87	0.83
Oracle	0.82	0.82	0.82	0.82	0.82
Weighted BFGS	0.81	0.79	0.77	0.80	0.83

Table 23. Precision on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.64	0.74	0.75	0.79	0.79
AdaS_svm	0.27	0.70	0.90	0.94	0.89
Joint BFGS	0.84	0.99	0.97	0.96	0.91
Joint MM	0.63	0.75	0.82	0.79	0.87
LassoJoint_BFGS	0.91	1.00	0.91	0.91	0.86
LassoJoint_BFGS_lambda.1se	0.59	0.81	0.91	0.94	0.97
LassoJoint_BFGS_lambda.min	0.83	0.95	0.91	0.95	0.91
LassoJoint_MM	1.00	1.00	0.98	0.93	0.94
LassoJoint_MM_lambda.1se		0.86	0.92	0.93	0.95
LassoJoint_MM_lambda.min	1.00	0.94	0.93	0.93	0.94
Naive	0.85	0.98	0.95	0.92	0.91
Oracle	0.95	0.95	0.95	0.95	0.95
Weighted BFGS	0.88	0.98	0.93	0.91	0.89

Table 24. Precision on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.66	0.87	0.92	0.81	0.79
AdaS_svm	0.63	0.92	0.92	0.82	0.80
Joint BFGS	0.77	0.84	0.80	0.78	0.93
Joint MM	0.80	0.85	0.82	0.78	0.76
LassoJoint_BFGS	0.75	0.84	0.80	0.78	0.93
LassoJoint_BFGS_lambda.1se			0.77	0.72	0.74
LassoJoint_BFGS_lambda.min	0.73	0.83	0.82	0.78	0.93
LassoJoint_MM	0.79	0.85	0.82	0.79	0.76
LassoJoint_MM_lambda.1se		0.81	0.78	0.72	0.74
LassoJoint_MM_lambda.min	0.79	0.84	0.83	0.79	0.76
Naive			1.00	0.86	0.80
Oracle	0.83	0.83	0.83	0.83	0.83
Weighted BFGS	0.73	0.83	0.81	0.78	0.89

Table 25. Precision on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.83	0.87	0.90	0.92	0.89
AdaS_svm	0.93	0.95	0.95	0.97	0.95
Joint BFGS	0.87	0.92	0.93	1.00	1.00
Joint MM	0.93	0.95	0.94	0.96	0.92
LassoJoint_BFGS	0.87	0.91	0.93	1.00	0.97
LassoJoint_BFGS_lambda.1se	1.00	0.91	0.93	1.00	0.94
LassoJoint_BFGS_lambda.min	0.91	0.92	0.92	1.00	0.97
LassoJoint_MM	0.92	0.95	0.94	0.96	0.92
LassoJoint_MM_lambda.1se	0.86	0.95	0.93	0.95	0.92
LassoJoint_MM_lambda.min	0.93	0.95	0.93	0.95	0.92
Naive	0.67	1.00	0.99	0.97	0.92
Oracle	0.94	0.94	0.94	0.94	0.94
Weighted BFGS	0.85	0.90	0.92	0.99	0.98

Table 26. Precision on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.97	0.99	1.00	0.97	0.97
AdaS_svm	0.99	1.00	1.00	1.00	0.98
Joint BFGS	0.96	0.96	0.91	0.88	0.98
Joint MM	0.97	0.96	0.95	0.97	0.98
LassoJoint_BFGS	0.99	0.96	0.88	0.90	1.00
LassoJoint_BFGS_lambda.1se	0.75	0.99	0.96	1.00	0.98
LassoJoint_BFGS_lambda.min	0.98	0.98	0.92	0.98	0.97
LassoJoint_MM	0.97	1.00	0.95	0.97	0.99
LassoJoint_MM_lambda.1se	0.99	0.99	0.98	0.98	0.97
LassoJoint_MM_lambda.min	1.00	1.00	0.97	0.97	1.00
Naive	0.86	1.00	0.98	1.00	0.98
Oracle	1.00	1.00	1.00	1.00	1.00
Weighted BFGS	0.96	0.92	0.86	0.97	0.99

Table 27. Precision on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.93	0.96	0.98	0.97	0.99
AdaS_svm	0.96	1.00	1.00	0.99	0.99
Joint BFGS	0.67	0.95	0.98	1.00	1.00
Joint MM	0.50	0.91	0.99	0.99	0.97
LassoJoint_BFGS	0.83	0.95	0.95	1.00	1.00
LassoJoint_BFGS_lambda.1se		0.90	0.98	0.99	1.00
LassoJoint_BFGS_lambda.min	0.90	0.96	0.95	0.99	1.00
LassoJoint_MM	0.75	0.94	0.98	0.99	0.97
LassoJoint_MM_lambda.1se		0.98	1.00	0.99	0.98
LassoJoint_MM_lambda.min	0.80	0.97	0.99	0.99	0.97
Naive	0.75	0.83	0.98	0.99	0.98
Oracle	0.99	0.99	0.99	0.99	0.99
Weighted BFGS	0.50	0.93	0.97	0.99	1.00

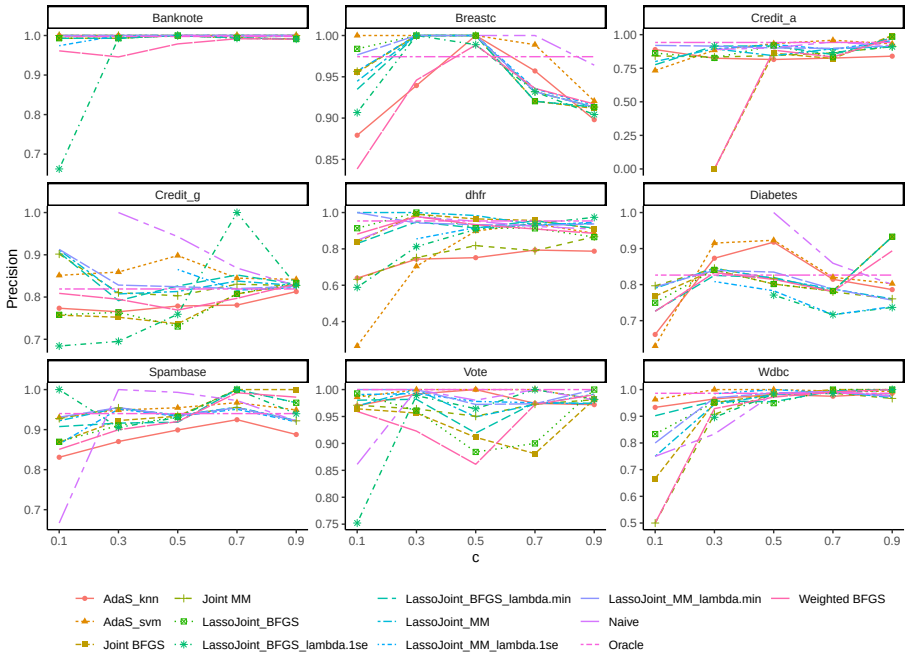

Fig. 3. The precision measure on test datasets

F1 score

Table 28. F1 score on 'Banknote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.86	0.82	0.94	0.99	0.99
AdaS_svm	0.90	0.89	0.97	0.98	1.00
Joint BFGS	1.00	1.00	0.99	1.00	0.99
Joint MM	0.98	0.98	0.98	0.99	0.99
LassoJoint_BFGS	1.00	1.00	0.99	1.00	0.99
LassoJoint_BFGS_lambda.1se	0.76	1.00	0.99	1.00	0.99
LassoJoint_BFGS_lambda.min	1.00	1.00	0.99	1.00	0.99
LassoJoint_MM	0.98	0.98	0.98	0.99	0.99
LassoJoint_MM_lambda.1se	0.84	0.98	0.98	0.99	0.99
LassoJoint_MM_lambda.min	0.98	0.98	0.98	0.99	0.99
Naive			0.57	0.94	0.99
Oracle	1.00	1.00	1.00	1.00	1.00
Weighted BFGS	0.97	0.96	0.97	0.99	0.99

Table 29. F1 score on 'Breastc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.67	0.84	0.96	0.95	0.89
AdaS_svm	0.77	0.86	0.88	0.95	0.89
Joint BFGS	0.89	0.91	0.98	0.94	0.88
Joint MM	0.83	0.83	0.97	0.94	0.89
LassoJoint_BFGS	0.90	0.92	0.98	0.94	0.89
LassoJoint_BFGS_lambda.1se	0.86	0.92	0.96	0.94	0.89
LassoJoint_BFGS_lambda.min	0.89	0.92	0.98	0.94	0.89
LassoJoint_MM	0.82	0.83	0.97	0.94	0.89
LassoJoint_MM_lambda.1se	0.82	0.89	0.95	0.94	0.89
LassoJoint_MM_lambda.min	0.86	0.86	0.96	0.94	0.89
Naive	0.05		0.60	0.94	0.90
Oracle	0.96	0.96	0.96	0.96	0.96
Weighted BFGS	0.77	0.90	0.96	0.94	0.89

Table 30. F1 score on 'Credit_a' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.49	0.73	0.78	0.76	0.86
AdaS_svm	0.26	0.75	0.83	0.86	0.88
Joint BFGS			0.65	0.84	0.36
Joint MM	0.36	0.24	0.82	0.84	0.91
LassoJoint_BFGS	0.72	0.85	0.40	0.84	0.72
LassoJoint_BFGS_lambda.1se		0.83		0.86	0.83
LassoJoint_BFGS_lambda.min	0.85	0.73	0.66	0.86	0.74
LassoJoint_MM	0.35	0.38	0.83	0.84	0.91
LassoJoint_MM_lambda.1se		0.71	0.87	0.84	0.90
LassoJoint_MM_lambda.min	0.48	0.73	0.86	0.86	0.90
Naive		0.20	0.50	0.67	0.90
Oracle	0.93	0.93	0.93	0.93	0.93
Weighted BFGS			0.44	0.84	0.61

Table 31. F1 score on 'Credit_g' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.64	0.55	0.64	0.66	0.71
AdaS_svm	0.52	0.50	0.61	0.71	0.72
Joint BFGS	0.70	0.75	0.81	0.79	0.79
Joint MM	0.61	0.72	0.79	0.73	0.81
LassoJoint_BFGS	0.71	0.74	0.80	0.77	0.78
LassoJoint_BFGS_lambda.1se	0.81	0.82	0.80	0.14	0.81
LassoJoint_BFGS_lambda.min	0.47	0.73	0.65	0.65	0.78
LassoJoint_MM	0.57	0.71	0.75	0.74	0.81
LassoJoint_MM_lambda.1se			0.68	0.67	0.82
LassoJoint_MM_lambda.min	0.28	0.64	0.75	0.68	0.81
Naive		0.03	0.31	0.71	0.81
Oracle	0.86	0.86	0.86	0.86	0.86
Weighted BFGS	0.74	0.79	0.82	0.77	0.81

Table 32. F1 score on 'dhfr' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.68	0.60	0.77	0.81	0.83
AdaS_svm	0.08	0.72	0.72	0.86	0.81
Joint BFGS	0.36	0.34	0.61	0.79	0.82
Joint MM	0.40	0.52	0.64	0.71	0.72
LassoJoint_BFGS	0.31	0.20	0.72	0.75	0.81
LassoJoint_BFGS_lambda.1se	0.74	0.78	0.81	0.94	0.93
LassoJoint_BFGS_lambda.min	0.54	0.44	0.75	0.81	0.83
LassoJoint_MM	0.18	0.25	0.60	0.78	0.83
LassoJoint_MM_lambda.1se		0.75	0.85	0.93	0.89
LassoJoint_MM_lambda.min	0.28	0.44	0.81	0.87	0.81
Naive	0.29	0.41	0.65	0.76	0.80
Oracle	0.94	0.94	0.94	0.94	0.94
Weighted BFGS	0.36	0.46	0.68	0.73	0.81

Table 33. F1 score on 'Diabetes' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.56	0.71	0.73	0.75	0.77
AdaS_svm	0.29	0.66	0.69	0.74	0.75
Joint BFGS	0.82	0.77	0.86	0.81	0.38
Joint MM	0.79	0.76	0.85	0.80	0.82
LassoJoint_BFGS	0.82	0.77	0.86	0.81	0.32
LassoJoint_BFGS_lambda.1se			0.84	0.80	0.81
LassoJoint_BFGS_lambda.min	0.82	0.75	0.86	0.81	0.30
LassoJoint_MM	0.79	0.76	0.85	0.80	0.82
LassoJoint_MM_lambda.1se		0.77	0.85	0.80	0.81
LassoJoint_MM_lambda.min	0.79	0.74	0.85	0.80	0.82
Naive			0.15	0.69	0.82
Oracle	0.87	0.87	0.87	0.87	0.87
Weighted BFGS	0.81	0.77	0.86	0.82	0.49

Table 34. F1 score on 'Spambase' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.59	0.79	0.84	0.88	0.90
AdaS_svm	0.54	0.80	0.86	0.91	0.94
Joint BFGS	0.85	0.92	0.79	0.03	0.01
Joint MM	0.59	0.87	0.91	0.94	0.93
LassoJoint_BFGS	0.86	0.92	0.78	0.02	0.48
LassoJoint_BFGS_lambda.1se	0.00	0.92	0.80	0.03	0.90
LassoJoint_BFGS_lambda.min	0.80	0.92	0.92	0.03	0.48
LassoJoint_MM	0.58	0.87	0.91	0.94	0.93
LassoJoint_MM_lambda.1se	0.46	0.87	0.91	0.94	0.93
LassoJoint_MM_lambda.min	0.50	0.86	0.91	0.94	0.93
Naive	0.01	0.04	0.44	0.91	0.92
Oracle	0.95	0.95	0.95	0.95	0.95
Weighted BFGS	0.83	0.90	0.79	0.14	0.19

Table 35. F1 score on 'Vote' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.82	0.89	0.86	0.94	0.90
AdaS_svm	0.72	0.79	0.83	0.95	0.93
Joint BFGS	0.68	0.49	0.81	0.88	0.92
Joint MM	0.37	0.48	0.83	0.91	0.91
LassoJoint_BFGS	0.62	0.59	0.80	0.88	0.92
LassoJoint_BFGS_lambda.1se	0.82	0.85	0.89	0.95	0.93
LassoJoint_BFGS_lambda.min	0.76	0.52	0.85	0.96	0.94
LassoJoint_MM	0.40	0.41	0.82	0.90	0.93
LassoJoint_MM_lambda.1se	0.91	0.82	0.89	0.96	0.93
LassoJoint_MM_lambda.min	0.60	0.42	0.87	0.93	0.94
Naive	0.07	0.28	0.60	0.78	0.89
Oracle	0.97	0.97	0.97	0.97	0.97
Weighted BFGS	0.64	0.50	0.78	0.90	0.89

Table 36. F1 score on 'Wdbc' dataset

method	0.1	0.3	0.5	0.7	0.9
AdaS_knn	0.72	0.87	0.86	0.96	0.98
AdaS_svm	0.83	0.88	0.83	0.94	0.99
Joint BFGS	0.05	0.89	0.88	0.11	0.38
Joint MM	0.03	0.79	0.84	0.95	0.96
LassoJoint_BFGS	0.13	0.90	0.87	0.27	0.43
LassoJoint_BFGS_lambda.1se		0.94	0.92	0.76	0.62
LassoJoint_BFGS_lambda.min	0.75	0.96	0.87	0.76	0.40
LassoJoint_MM	0.08	0.82	0.85	0.96	0.97
LassoJoint_MM_lambda.1se		0.94	0.88	0.97	0.98
LassoJoint_MM_lambda.min	0.11	0.93	0.85	0.96	0.97
Naive	0.08	0.13	0.45	0.91	0.97
Oracle	0.97	0.97	0.97	0.97	0.97
Weighted BFGS	0.03	0.83	0.86	0.26	0.77

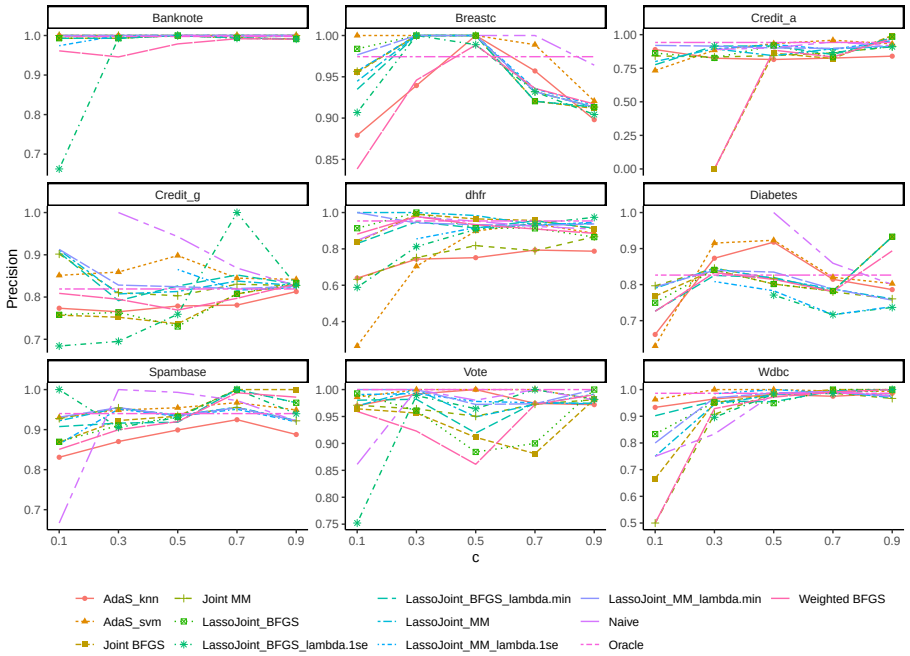

Fig. 4. The F1 score measure on test datasets