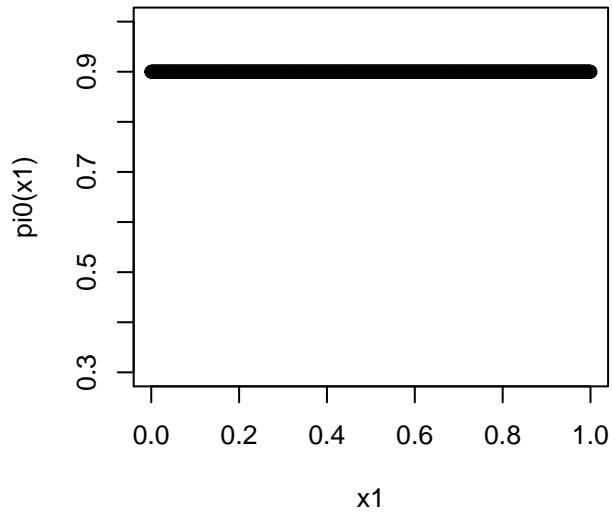


## Simulations, independence

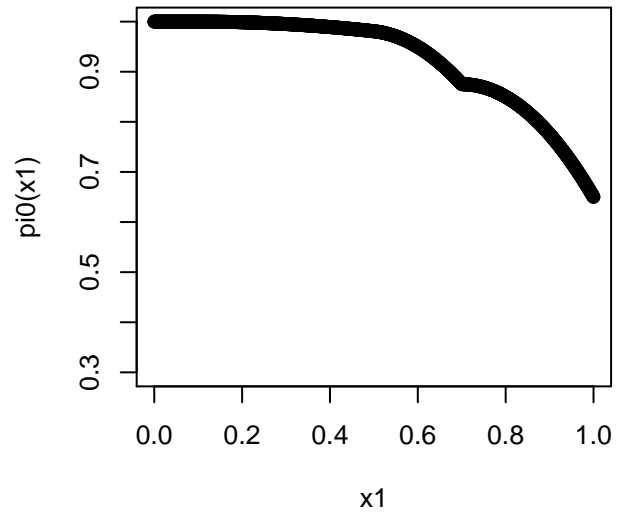
Consider 1,000 tests in each simulation, 200 simulations per scenario, nominal FDR = 5%.

The following 4 functions are considered for  $\pi_0(x)$ :

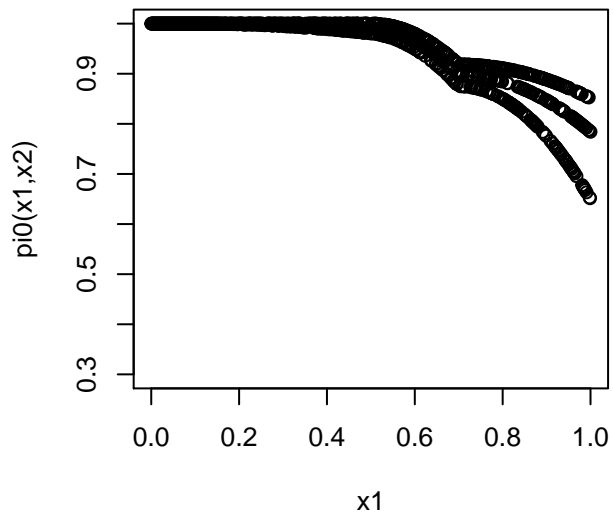
I



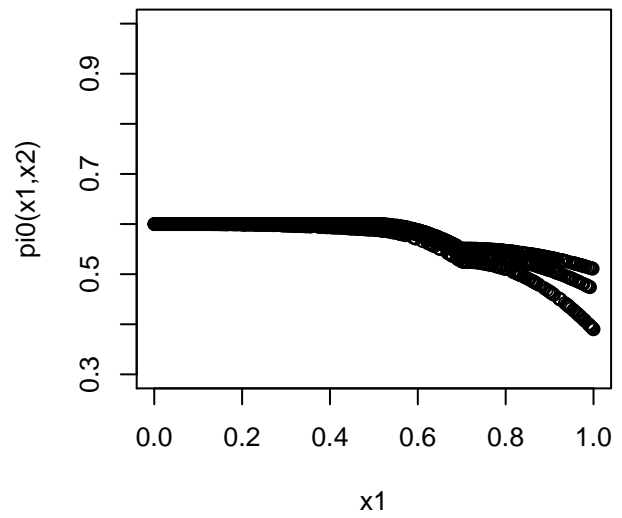
II



III



IV



Estimated false discovery rates (FDR) and true positive rates (TPR) percentages. BL = Boca-Leek. W.S. = well-separated null and alternative, P.S. = poorly separated null and alternative. For III and IV, a dummy variable was used for  $x_2$ , along with linear or spline terms for  $x_1$ . Used reviewer’s definition of “well-separated” and “poorly-separated.” Used both the theoretical and empirical nulls for the Scott method. For the t-test, considered 2 groups of 6 (so  $2 \times 6 = 10$  df) and used the t-statistics instead of the z-statistics for the Scott method. Extended “well-separated” and “poorly-separated” definition to chisquared test, generating means from the absolute value of a normal distribution with mean 9, respectively 1. For the chisquared test, 1 df corresponds to a  $2 \times 2$  table, 4 df to a  $3 \times 3$  table. Used the z-values obtained from back-transforming the p-values for the Scott method in this case.

$\pi_0(x)$	Dist. under $H_1$	Reg. model	FDR						TPR			
			BL	Scott T	Scott E	Storey	BH	BL	Scott T	Scott E	Storey	BH
I	Beta(1,20)	Linear	5.0	90.0	84.0	5.2	3.9	0.2	100.0	95.9	0.2	0.1
II	Beta(1,20)	Linear	4.8	92.6	85.9	4.8	4.1	0.2	100.0	98.0	0.1	0.1
II	Beta(1,20)	Spline	6.5	92.6	86.6	4.8	4.1	0.2	100.0	98.3	0.1	0.1
III	Beta(1,20)	Linear	5.2	94.9	88.9	5.4	5.4	0.2	100.0	97.5	0.2	0.2
III	Beta(1,20)	Spline	6.2	94.9	89.4	5.4	5.4	0.3	100.0	97.6	0.2	0.2
IV	Beta(1,20)	Linear	6.4	56.7		5.1	3.4	12.2	100.0		5.4	0.3
IV	Beta(1,20)	Spline	7.9	56.7		5.1	3.4	15.4	100.0		5.4	0.3
I	Norm (W.S.)	Linear	5.0	5.2	6.6	4.9	4.4	51.0	50.9	49.7	50.8	49.7
II	Norm (W.S.)	Linear	5.4	5.7	8.1	5.3	4.9	48.5	63.5	61.3	47.6	47.0
II	Norm (W.S.)	Spline	5.6	5.9	8.3	5.3	4.9	49.3	63.5	61.5	47.6	47.0
III	Norm (W.S.)	Linear	5.8	5.9	9.9	5.4	5.1	45.1	60.3	57.9	44.0	43.4
III	Norm (W.S.)	Spline	5.9	6.0	10.1	5.4	5.1	45.6	60.9	58.2	44.0	43.4
IV	Norm (W.S.)	Linear	5.0	4.9	2.4	4.7	2.8	71.6	71.8	60.6	71.2	65.4
IV	Norm (W.S.)	Spline	5.2	5.0	2.4	4.7	2.8	72.0	71.9	60.7	71.2	65.4
I	T (W.S.)	Linear	5.7	21.3	23.4	5.5	4.8	15.7	55.4	56.9	15.2	13.6
II	T (W.S.)	Linear	4.8	20.7	23.8	5.0	4.4	13.0	64.5	65.5	11.6	10.6
II	T (W.S.)	Spline	4.7	21.1	24.5	5.0	4.4	13.8	64.8	65.6	11.6	10.6
III	T (W.S.)	Linear	6.2	26.8	31.0	5.9	5.4	9.4	54.6	54.7	8.2	7.6
III	T (W.S.)	Spline	6.8	27.3	31.3	5.9	5.4	10.0	55.2	55.3	8.2	7.6
IV	T (W.S.)	Linear	5.0	9.3	2.8	4.7	2.9	52.5	72.9	44.4	52.0	40.3
IV	T (W.S.)	Spline	5.4	9.3	2.8	4.7	2.9	53.0	73.0	44.6	52.0	40.3
I	Chisq 1 df (W.S.)	Linear	5.0	90.0	85.5	4.8	4.4	51.2	100.0	98.7	50.9	49.7
II	Chisq 1 df (W.S.)	Linear	4.8	92.6	89.4	4.8	4.4	48.3	100.0	99.6	47.1	46.3
II	Chisq 1 df (W.S.)	Spline	5.0	92.6	90.0	4.8	4.4	48.9	100.0	99.6	47.1	46.3
III	Chisq 1 df (W.S.)	Linear	5.0	94.9	93.8	4.9	4.8	44.3	100.0	99.7	43.1	42.5
III	Chisq 1 df (W.S.)	Spline	5.3	94.9	93.9	4.9	4.8	44.8	100.0	99.7	43.1	42.5
IV	Chisq 1 df (W.S.)	Linear	5.1	56.7		4.7	2.8	71.6	100.0		71.1	65.1
IV	Chisq 1 df (W.S.)	Spline	5.3	56.7		4.7	2.8	71.9	100.0		71.1	65.1
I	Chisq 4 df (W.S.)	Linear	5.3	90.0	83.5	5.4	4.8	30.8	100.0	95.3	30.6	29.6
II	Chisq 4 df (W.S.)	Linear	5.3	92.6	89.6	5.3	5.0	28.4	100.0	98.5	27.5	26.7
II	Chisq 4 df (W.S.)	Spline	5.4	92.6	89.9	5.3	5.0	29.2	100.0	98.6	27.5	26.7
III	Chisq 4 df (W.S.)	Linear	5.9	94.9	92.4	5.4	5.3	24.8	100.0	98.3	24.0	23.4
III	Chisq 4 df (W.S.)	Spline	5.9	94.9	93.0	5.4	5.3	25.2	100.0	98.7	24.0	23.4
IV	Chisq 4 df (W.S.)	Linear	5.1	56.7	55.9	4.7	2.8	52.3	100.0	98.8	51.7	44.5
IV	Chisq 4 df (W.S.)	Spline	5.5	56.7	55.9	4.7	2.8	52.7	100.0	98.8	51.7	44.5