

ONLINE SUPPLEMENT TO
Bayesian Inventory Management with Potential Change-Points in
Demand

February 17, 2014

Table 1: Bounds and performance of heuristic policies (for $p = 4$).

Instance	p	S^c	γ	T	LB^I	LB^M	Myopic	Gap%	LA-M	Gap%	LA-I	Gap%	OPTCHG	Gap%	OPTNOCHG	Gap%
1	4	1	0.2	5	44.2602 (0.0300)	40.2985	48.6139 (0.2522)	9.84%	47.8105 (0.2813)	8.02%	47.7771 (0.2813)	7.95%	70.0338 (0.4479)	58.23%	50.7043 (0.2446)	14.56%
2			10	84.0165 (0.0815)	79.8954	91.9763 (0.3638)	9.47%	88.8875 (0.4381)	5.80%	88.8786 (0.4381)	5.79%	111.9046 (0.6380)	33.19%	98.6992 (0.3404)	17.48%	
3			0.5	36.0135 (0.0435)	28.6732	43.4133 (0.2227)	20.55%	38.8092 (0.3340)	7.76%	38.8092 (0.3341)	7.76%	46.6789 (0.4608)	29.61%	54.4962 (0.1968)	51.32%	
4			10	63.6631 (0.1084)	56.2041	76.7642 (0.3807)	20.58%	67.0066 (0.5579)	5.24%	67.0073 (0.5578)	5.25%	76.3320 (0.6978)	19.90%	103.3729 (0.2788)	62.37%	
5			0.8	22.0591 (0.0426)	17.0479	23.9697 (0.2677)	8.66%	22.3516 (0.3112)	1.33%	22.3695 (0.3110)	1.41%	24.1799 (0.3593)	9.61%	58.5846 (0.1424)	165.58%	
6			10	37.4009 (0.0963)	32.5127	39.6241 (0.4332)	5.94%	37.6655 (0.4923)	0.71%	37.6956 (0.4926)	0.79%	40.0088 (0.5487)	6.97%	107.5167 (0.2197)	187.47%	
7			0.2	5	49.0070 (0.0322)	47.7366	48.7423 (0.3235)	-0.54%	48.7458 (0.3320)	-0.53%	48.6971 (0.3320)	-0.63%	54.5038 (0.3855)	11.22%	50.2701 (0.3848)	2.58%
8			10	94.9790 (0.0822)	93.2702	96.7444 (0.9367)	1.86%	96.8358 (0.9426)	1.95%	96.9036 (0.9419)	2.03%	104.2959 (0.9735)	9.81%	102.1953 (1.9602)	7.60%	
9			0.5	5	48.8989 (0.0567)	47.2685	50.2127 (0.6127)	2.69%	50.2743 (0.6288)	2.81%	50.2894 (0.6282)	2.84%	52.5278 (0.6462)	7.42%	55.6318 (0.9321)	13.77%
10			10	91.8506 (0.1386)	89.6411	91.1438 (0.7395)	-0.77%	91.0979 (0.7590)	-0.82%	91.1161 (0.7590)	-0.80%	93.9750 (0.7833)	2.31%	103.9225 (1.0202)	13.14%	
11			0.8	5	47.7916 (0.0997)	46.8004	47.5917 (0.5779)	-0.42%	47.5791 (0.6053)	-0.44%	47.5838 (0.6053)	-0.43%	47.7965 (0.6020)	0.01%	58.3675 (0.8011)	22.13%
12			10	87.3003 (0.1838)	86.0120	87.8162 (0.9571)	0.59%	87.8291 (0.9807)	0.61%	87.8203 (0.9811)	0.60%	88.2033 (0.9799)	1.03%	110.9037 (1.3330)	27.04%	
13			0.2	5	57.9729 (0.0841)	57.0343	58.9042 (0.7166)	1.61%	58.9587 (0.7259)	1.70%	58.9057 (0.7261)	1.61%	62.0016 (0.6796)	6.95%	63.8663 (1.1738)	10.17%
14			10	111.7873 (0.1935)	109.9887	112.2596 (1.0345)	0.42%	112.3044 (1.0430)	0.46%	112.4167 (1.0423)	0.56%	116.9715 (0.9879)	4.64%	120.8614 (1.6703)	8.12%	
15			0.5	5	71.5720 (0.1246)	70.5127	72.6331 (1.1820)	1.48%	72.7385 (1.2015)	1.63%	72.7967 (1.2012)	1.71%	73.8998 (1.1596)	3.25%	84.4206 (1.9401)	17.95%
16			10	133.1615 (0.2842)	131.4374	133.4709 (1.6529)	0.23%	133.5803 (1.6705)	0.31%	133.6872 (1.6707)	0.39%	135.4040 (1.6255)	1.68%	156.5064 (2.9744)	17.53%	
17			0.8	5	84.2389 (0.1610)	83.9910	84.5122 (1.1380)	0.32%	84.6686 (1.1667)	0.51%	84.7448 (1.1662)	0.60%	84.6195 (1.1357)	0.45%	104.4125 (1.9984)	23.95%
18			10	153.9864 (0.3783)	152.8861	151.6374 (1.7981)	-1.53%	151.6634 (1.8192)	-1.51%	151.8150 (1.8183)	-1.41%	151.8920 (1.7973)	-1.36%	187.2579 (3.1556)	21.61%	
19			0.2	5	69.4510 (0.1371)	66.3320	68.9114 (1.1634)	-0.78%	68.9921 (1.1821)	-0.66%	69.0128 (1.1811)	-0.63%	80.7187 (1.0688)	16.22%	79.7388 (1.8292)	14.81%
20			10	130.3991 (0.3214)	126.7072	128.4335 (1.3967)	-1.51%	128.3924 (1.4152)	-1.54%	128.5080 (1.4144)	-1.45%	141.7576 (1.2666)	8.71%	145.4677 (2.5222)	11.56%	
21			0.5	5	97.7850 (0.2044)	93.7568	99.3455 (1.5961)	1.60%	99.4196 (1.6115)	1.67%	99.3997 (1.6122)	1.65%	103.8835 (1.5150)	6.24%	128.4318 (2.6922)	31.34%
22			10	177.9418 (0.4405)	173.2337	175.9873 (2.2885)	-1.10%	176.0794 (2.3190)	-1.05%	176.1322 (2.3190)	-1.02%	181.3826 (2.1953)	1.93%	228.1226 (4.3339)	28.20%	
23			0.8	5	123.0121 (0.2581)	121.1817	123.2082 (1.7843)	0.16%	123.2665 (1.8404)	0.21%	123.1802 (1.8386)	0.14%	123.6944 (1.7708)	0.55%	172.5764 (3.2662)	40.29%
24			10	221.9555 (0.5335)	219.7602	227.0736 (3.0419)	2.31%	227.3077 (3.1013)	2.41%	227.5123 (3.1013)	2.50%	227.7564 (3.0311)	2.61%	322.0775 (5.8002)	45.11%	
25			0.2	5	79.0277 (0.1694)	73.7701	81.3868 (1.5376)	2.99%	81.5417 (1.5561)	3.18%	81.5254 (1.5572)	3.16%	103.7473 (1.3789)	31.28%	100.5450 (2.8853)	27.23%
26			10	145.9312 (0.3813)	140.0821	147.5893 (2.1891)	1.14%	147.6194 (2.1995)	1.16%	147.5604 (2.2017)	1.12%	172.4589 (1.9981)	18.18%	180.5146 (3.8907)	23.70%	
27			0.5	5	119.9931 (0.2597)	112.3521	119.9678 (1.9684)	-0.02%	120.2040 (2.0425)	0.18%	120.2400 (2.0415)	0.21%	129.2623 (1.8493)	7.72%	167.2167 (3.4519)	39.36%
28			10	214.9305 (0.5689)	206.6707	215.8146 (2.9533)	0.41%	215.9196 (3.0154)	0.46%	216.0275 (3.0163)	0.51%	225.5911 (2.8086)	4.96%	303.9669 (5.8597)	41.43%	
29			0.8	5	154.4294 (0.3141)	150.9342	156.2210 (2.1012)	1.16%	155.9595 (2.1880)	0.99%	155.9127 (2.1871)	0.96%	157.2619 (2.0786)	1.83%	241.0842 (4.1260)	56.11%
30			10	276.9906 (0.7313)	273.2594	278.9428 (3.3460)	0.70%	278.8956 (3.4385)	0.69%	279.1745 (3.4364)	0.79%	280.1753 (3.3184)	1.15%	427.4608 (6.6787)	54.32%	

$a^h = 48, S^h = 160, a^c = 3$ for all instances. Standard errors are reported in the parentheses below the corresponding estimates.

Table 2: Bounds and performance of heuristic policies (for $p = 9$).

Scenario	p	S^c	γ	T	LB^I	LB^M	Myopic	Gap%	LA-M	Gap%	LA-I	Gap%	OPTCHG	Gap%	OPTNOCHG	Gap%	
31	9	1	0.2	5	61.1904 (0.0363)	55.4161	66.0950 (0.3813)	8.02%	65.3310 (0.4260)	6.77%	65.3898 (0.4264)	6.86%	119.6096 (0.8175)	95.47%	67.5849 (0.3711)	10.45%	
32			10	115.9198 (0.1048)	109.5441	127.3287 (0.5961)	9.84%	123.8637 (0.6884)	6.85%	123.8018 (0.6881)	6.80%	179.0718 (1.1089)	54.48%	133.2049 (0.6023)	14.91%		
33		0.5	5	51.6779 (0.0515)	39.8750	62.6175 (0.3434)	21.17%	57.6761 (0.4962)	11.61%	57.7223 (0.4961)	11.70%	79.4264 (0.8419)	53.70%	71.9651 (0.3008)	39.26%		
34			10	89.8931 (0.1400)	77.5695	110.8216 (0.5292)	23.28%	96.2635 (0.7978)	7.09%	96.3213 (0.7981)	7.15%	117.9758 (1.1576)	31.24%	136.1178 (0.4302)	51.42%		
35		0.8	5	33.9116 (0.0549)	24.3338	42.5325 (0.3486)	25.42%	35.1911 (0.5127)	3.77%	35.1770 (0.5122)	3.73%	39.2202 (0.6374)	15.65%	75.1120 (0.2113)	121.49%		
36			10	55.3823 (0.1298)	45.5950	69.8179 (0.5623)	26.07%	57.4437 (0.7742)	3.72%	57.4092 (0.7744)	3.66%	62.4115 (0.9114)	12.69%	139.1579 (0.3606)	151.27%		
37		5	0.2	5	68.2613 (0.0578)	66.5945	68.3438 (0.6195)	0.12%	68.4819 (0.6407)	0.32%	68.4134 (0.6401)	0.22%	77.2369 (0.7142)	13.15%	70.6814 (0.8241)	3.55%	
38			10	131.4879 (0.1298)	128.9670	130.9327 (0.7581)	-0.42%	131.0082 (0.7795)	-0.36%	130.9820 (0.7795)	-0.38%	142.2273 (0.8762)	8.17%	136.2961 (0.9812)	3.66%		
39		0.5	5	69.6107 (0.0819)	67.8210	71.8763 (0.9313)	3.25%	71.9161 (0.9685)	3.31%	71.8945 (0.9684)	3.28%	75.6364 (1.0025)	8.66%	79.3094 (1.3886)	13.93%		
40			10	128.6514 (0.1840)	126.1269	129.9798 (1.1578)	1.03%	130.0201 (1.2088)	1.06%	130.1501 (1.2100)	1.16%	134.4743 (1.2412)	4.53%	149.8462 (2.2242)	16.47%		
41		0.8	5	69.2368 (0.1085)	69.0474	69.7628 (0.9214)	0.76%	69.4875 (0.9753)	0.36%	69.5292 (0.9747)	0.42%	69.9956 (0.9788)	1.10%	83.5777 (1.4117)	20.71%		
42			10	123.8577 (0.2502)	123.2868	126.0234 (1.3977)	1.75%	125.6479 (1.4565)	1.45%	125.5474 (1.4574)	1.36%	126.4015 (1.4605)	2.05%	157.5532 (2.2369)	27.21%		
43		10	0.2	5	82.9084 (0.1180)	80.5675	85.1349 (1.2622)	2.69%	85.3072 (1.2941)	2.89%	85.3328 (1.2949)	2.92%	91.8815 (1.1477)	10.82%	95.9392 (2.2363)	15.72%	
44			10	156.8300 (0.2565)	153.2457	156.2390 (1.7054)	-0.38%	156.2625 (1.7287)	-0.36%	156.1375 (1.7297)	-0.44%	165.1992 (1.5966)	5.34%	173.7639 (3.2321)	10.80%		
45		0.5	5	104.6872 (0.1711)	102.7535	104.9841 (1.7121)	0.28%	105.0321 (1.7576)	0.33%	105.1056 (1.7564)	0.40%	107.5636 (1.6505)	2.75%	130.2901 (3.1338)	24.46%		
46			10	190.5104 (0.4586)	186.8236	192.4793 (2.3973)	1.03%	192.8606 (2.4637)	1.23%	192.7834 (2.4632)	1.19%	195.3915 (2.3261)	2.56%	243.5657 (4.8744)	27.85%		
47		0.8	5	124.2541 (0.2206)	124.9394	125.3180 (2.3368)	0.30%	125.2078 (2.4674)	0.21%	125.3330 (2.4679)	0.32%	125.1134 (2.3756)	0.14%	173.9835 (6.5114)	39.25%		
48			10	220.4895 (0.5201)	220.4015	225.7410 (3.7755)	2.38%	225.6352 (3.8595)	2.33%	225.4773 (3.8606)	2.26%	225.7092 (3.8147)	2.37%	315.9940 (9.0070)	43.31%		
49		15	0.2	5	101.8251 (0.1972)	94.5405	105.1655 (2.2138)	3.28%	105.4191 (2.2933)	3.53%	105.3874 (2.2930)	3.50%	127.2669 (1.9864)	24.99%	132.7373 (4.3214)	30.36%	
50			10	185.8816 (0.4027)	177.5244	185.1078 (2.4595)	-0.42%	185.2298 (2.5062)	-0.35%	185.1927 (2.5064)	-0.37%	210.1563 (2.1681)	13.06%	230.0009 (5.2738)	23.74%		
51		0.5	5	146.0909 (0.2866)	137.6860	152.7883 (3.0571)	4.58%	152.2501 (3.1529)	4.22%	152.4174 (3.1669)	4.33%	157.2722 (3.0109)	7.65%	232.6362 (7.1631)	59.24%		
52			10	256.0934 (0.6001)	247.5203	261.6285 (5.4350)	2.16%	261.3473 (5.4771)	2.05%	261.3212 (5.4815)	2.04%	270.3129 (5.2919)	5.55%	394.3230 (11.5214)	53.98%		
53		0.8	5	182.9305 (0.3744)	180.8314	189.9012 (3.2691)	3.81%	188.9480 (3.4505)	3.29%	188.9102 (3.4481)	3.27%	189.5009 (3.3094)	3.59%	316.0882 (7.1661)	72.79%		
54			10	321.4416 (0.7966)	317.5162	324.7263 (4.4585)	1.02%	323.4369 (4.6475)	0.62%	323.2105 (4.6443)	0.55%	324.2532 (4.4848)	0.87%	533.5367 (10.6901)	65.98%		
55		19	0.2	5	118.4147 (0.2644)	105.7189	117.8387 (2.2865)	-0.49%	117.8563 (2.3342)	-0.47%	117.8209 (2.3358)	-0.50%	158.1329 (1.9054)	33.54%	157.0130 (4.5438)	32.60%	
56			10	210.3484 (0.5404)	196.9473	209.1055 (3.3322)	-0.59%	209.2530 (3.3648)	-0.52%	209.3367 (3.3662)	-0.48%	253.6930 (2.9228)	20.61%	282.7756 (7.4551)	34.43%		
57		0.5	5	180.5282 (0.4022)	165.6320	193.2156 (4.3832)	7.03%	192.3081 (4.6236)	6.53%	192.1542 (4.6209)	6.44%	206.1225 (4.2672)	14.18%	316.3742 (9.8222)	75.25%		
58			10	311.4859 (0.7947)	296.0776	314.3829 (4.6752)	0.93%	313.5278 (4.9503)	0.66%	313.4965 (4.9553)	0.65%	329.5138 (4.4504)	5.79%	521.8764 (11.7488)	67.54%		
59		0.8	5	230.0394 (0.5152)	225.5450	236.3184 (6.0775)	2.73%	233.9367 (6.5851)	1.69%	233.7963 (6.5785)	1.63%	235.3142 (6.1414)	2.29%	449.7314 (16.0711)	95.50%		
60			10	400.4063 (0.9693)	395.2080	415.2349 (5.8459)	3.70%	413.2852 (6.1474)	3.22%	413.0785 (6.1480)	3.16%	414.5634 (5.8903)	3.54%	773.1140 (14.9257)	93.08%		

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