Stock Price Prediction Through the Mixture of Gaussian Processes via the Precise Hard-cut EM Algorithm

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100871,
jwma@math.pku.edu.cn

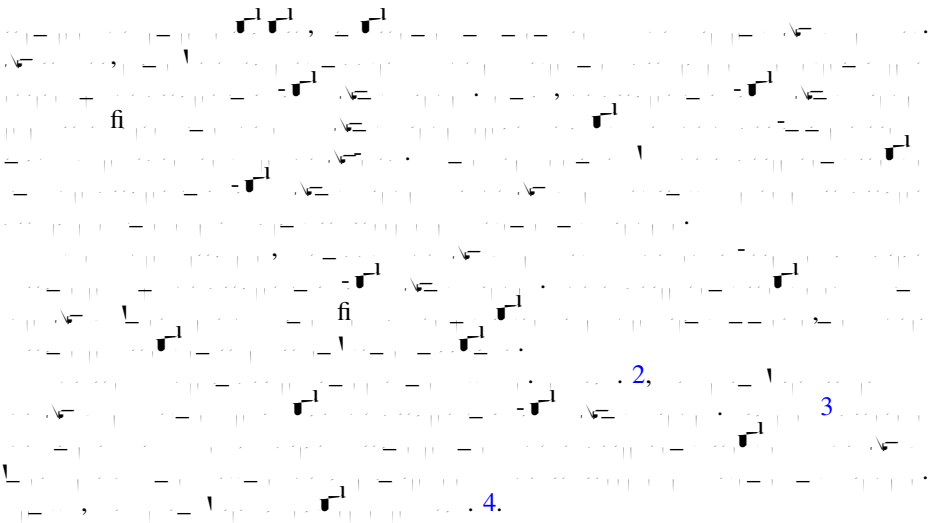
Abstract.

Keywords:

1 Introduction

[1] [2] [3] [4] [5] [6] [7]

. 2016, 773, . 282–2 3, 2016.
. 10.1007/ 78-3-31 -422 7-8 27



2 The Precise Hard-cut EM Algorithm for MGPs

2.1 The MGP Model

$$\pi_{\_}, \quad 1, 2, \ldots, \quad , \qquad 1$$

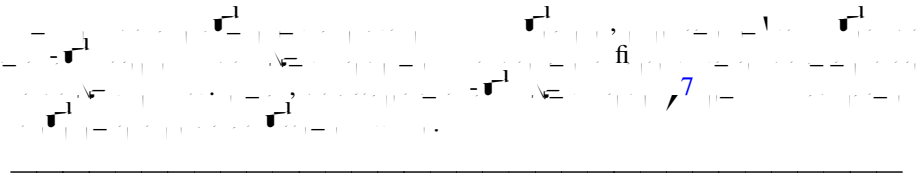
$$, \theta \_\_ \quad \mu , \quad \_\_ \quad 1, 2, \ldots, \quad , \qquad 2$$

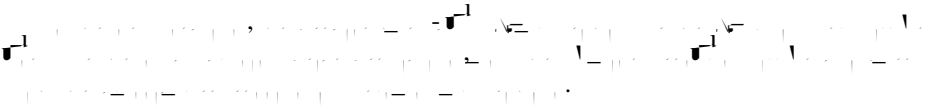
$$, \theta \_\_ \prod_{1}^{C} \quad 0, \quad , \quad \theta \_\_ \sigma^2 \quad \_\_ \qquad 3$$

$$(\quad , \quad)^{2} \quad -\tfrac{1}{2}(\quad - \quad) \quad (\quad - \quad),$$

. (2)

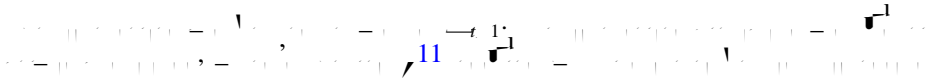
2.2 The Precise Hard-cut EM Algorithm





3 Stock Price Prediction

3.1 The General Prediction Model



1, 2, 3, 4 τ 1, 2, 3, 4, 700 1 σ, σ 700 600 100

3.2 Prediction Results and Comparisons

16 $\hat{y}$ $\hat{y}\sigma$

(1) 12

(2)

(3) 13 ( ),

10

$\hat{y}_t$ 5 16.00 2014

1.

3, τ 1,

14, 15 .

3, τ 1

fi

1

Table 1.

	τ								
1	1	21.1 33	0.2224	**21.2151**	0.2218	21.2106	**0.2194**	**21.5791**	**0.2204**
1	2	31.8 31	0.3174	32.5150	0.3258	31.576	0.3134	33.4016	0.3188
1	3	38.8 45	0.3713	40.4267	0.3864	3 .1431	0.3654	41.3143	0.3784
1	4	43. 104	0.4144	45. 821	0.4207	43.8 47	0.4030	47. 2	0.415
2	1	21.2464	0.21 2	21.4326	0.220	21.287	0.21 5	21.8 3	0.2216
2	2	32.01	0.3133	32.8077	0.3428	31.8553	0.3146	33.547	0.3232
2	3	3 .3107	0.3737	41.6617	0.3 18	38.0136	0.3556	47.1278	0.3621
2	4	43.7612	0.3 40	45.822	0.4418	43.78 5	0.4016	53.147	0.3 75
3	1	**21.0782**	**0.2183**	21.47 7	**0.2203**	**21.0879**	0.2206	22. 824	0.2272
3	2	32.0317	0.31 2	33.1330	0.3547	31.5318	0.315	36.3263	0.3126
3	3	3 .1218	0.3448	42.025	0.408	38.54 2	0.3545	43.5631	0.357
3	4	44. 140	0.3 01	52.6 17	0.4585	43.7351	0.3726	57.808	0.40 6
4	1	21.1804	0.2225	21.8 33	0.2212	21.1461	0.221	22. 345	0.2341
4	2	33.3603	0.3125	33.30	0.4030	32.1 45	0.3104	38.2823	0.3131
4	3	3 .578	0.36 5	43.0564	0.4681	3 .1205	0.3586	54.2466	0.3705
4	4	45. 405	0.4067	58.103	0.5645	45.3620	0.3 60	72.0162	0.4536

600

2 3 3

τ 1,

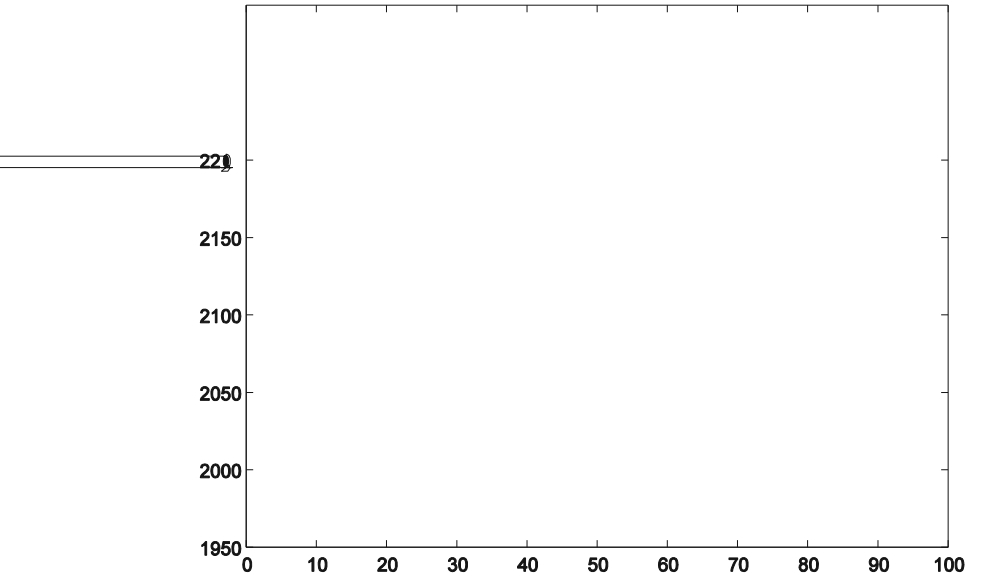
100

21.0782 0.2183 1

±0.2 ±0.4 . 2 3.

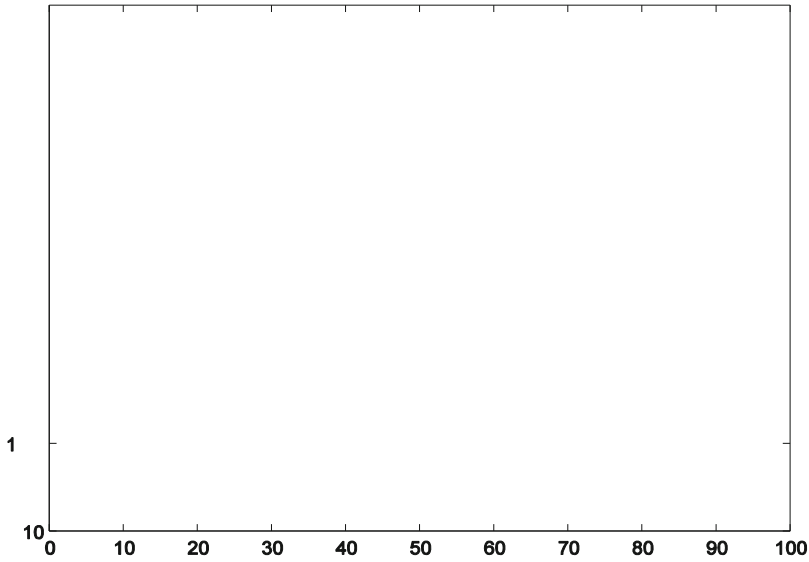
2.

6



(a)

(b)



(a)

(b)

Table 2.

	τ								
1	1	5 .5766	120.286	77.7581	103.5 80	84.82 1	72.0887	6.6121	0.84 1
1	2	77.6747	110.2 47	66.0087	86. 751	60.2808	86.6801	1. 530	0.5538
1	3	8 .4715	105.6588	56.4041	0.7678	71.2045	5 .5331	1.3176	1.2327
1	4	110.5455	101.7635	54.8 22	87.8 87	82.563	65.4218	0.3662	0.74 0
2	1	72.127	224.2375	88.253	104.47 0	7.8030	105.5201	0.7642	0.5208
2	2	3.364	140.5822	65.211	78.5423	122. 084	114.4137	0.7450	0.504
2	3	112.4 34	126.7071	54.13 7	8 .6782	101.0682	147.62 1	1.2788	0.4 43
2	4	152.22 6	131.77 6	55.6 3	75.1 38	101.6412	134.8176	0.37 3	0.52 0
3	1	176. 017	211.0 05	70.8 60	101.1628	12 .4165	120.8225	0.75 3	0.782
3	2	115.6750	1 8.6486	5 .2711	76.5386	127.86 5	130.1543	1.2261	0.8615
3	3	115.2516	1 8.8352	64.5232	7 .8847	126.0775	130.8770	0.7630	0.6358
3	4	130.5847	180.8102	53.02 1	73.4 77	117.0582	138.7150	0.3607	0.7125
4	1	247. 665	266.5358	75.6300	86.773	153.3 17	160.6503	1.2 26	1.02
4	2	146.0758	215.256	57. 361	78.0230	155.2156	16 .2637	0.7 64	0.7 65
4	3	81.0702	255.1 25	53.7123	74.4203	155.8308	180.2085	1.2557	0.7503
4	4	12 .1127	225.2805	51.6860	76. 758	14 .6366	15 .0454	1.8375	0.7804

. 4. fi

. 2, 3 4

$\tau_{\ldots}, \ldots, -2\tau_{\ldots} - \tau_{\ldots}$

$1, 2, 3, 4, 5$ τ $1, 2, 3, 4$

. 5. . 5 τ. $\geq 3,$

(a)

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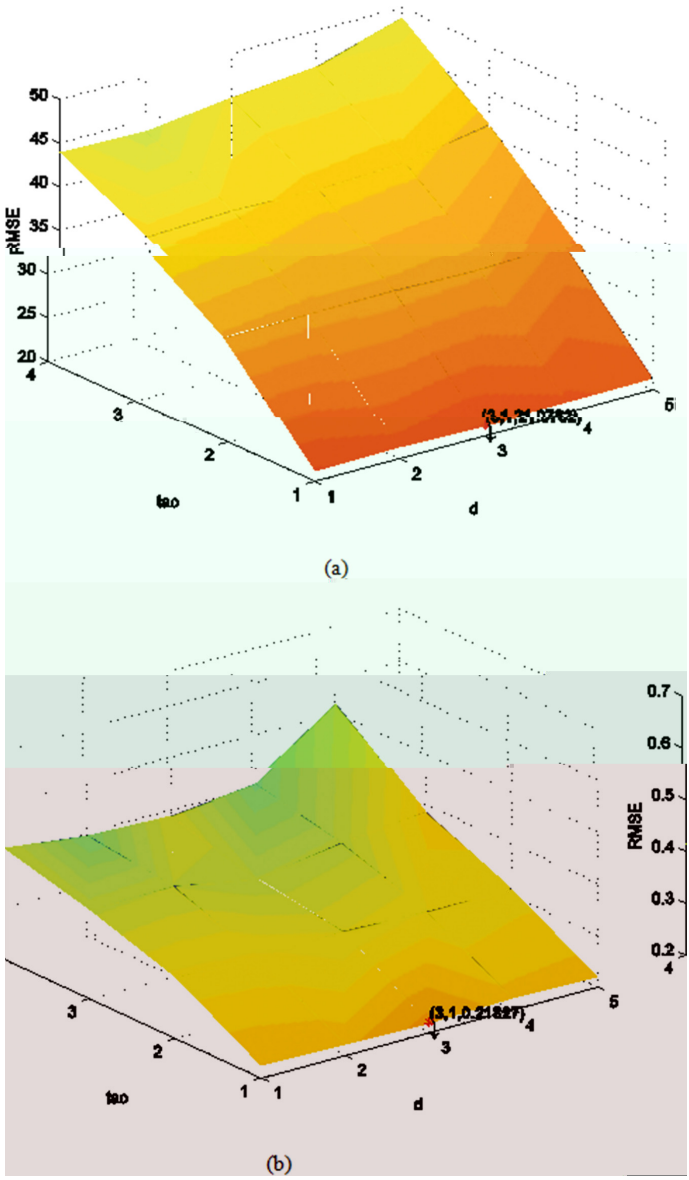

Fig. 5. ( ). 100 . ( ). 100 τ.

4 Conclusion

Acknowledgement. 61171138.

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