国泰君安191因子回测-151-160

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April 28, 2020

1 Alpha151

$$Alpha = SMA(CLOSE - DELAY(CLOSE, 20), 20, 1) \tag{1}$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-10.0	-2.48	-12.82	8.4	-2.39(-0.151)	28.42	0.43	-61.07	-2.95	836 X 952	-6.5	14.01	-19.14	-0.0028
20110101-20111231	10.0	-10.0	0.07	0.35	6.46	0.07(0.004)	10.21	0.5	2.21	0.02	1216 X 906	-39.49	-39.34	40.2	0.0002
20120101-20121231	10.0	-10.0	-1.29	-6.66	7.22	-1.48(-0.094)	19.84	0.49	-36.8	-1.42	1303 X 1057	-3.14	3.25	-10.15	-0.0015
20130101-20131231	10.0	-10.0	-1.5	-7.88	7.49	-1.36(-0.086)	19.92	0.43	-42.05	-1.4	980 X 1466	9.99	19.03	-25.73	-0.0015
20140101-20141231	9.96	-10.01	-2.41	-12.25	6.36	-1.83(-0.116)	31.34	0.44	-77.5	-2.54	1061 X 1443	19.42	35.54	-43.91	-0.0026
20150101-20151231	10.0	-10.0	0.29	1.39	6.65	0.11(0.007)	30.73	0.45	9.0	0.05	1196 X 1500	85.23	46.78	-82.21	-0.0014
20160101-20161231	10.0	-10.0	-1.97	-10.08	7.19	-1.47(-0.093)	25.51	0.5	-56.01	-1.74	1286 X 1573	-34.87	-15.42	14.72	-0.0023
20170101-20171231	10.0	-10.0	0.68	3.49	6.34	0.63(0.04)	13.35	0.57	22.06	0.47	1540 X 1687	-20.94	0.88	27.93	0.0013
20180101-20181231	10.0	-9.99	-0.47	-2.39	6.51	-0.4(-0.025)	17.27	0.48	-14.9	-0.24	2192 X 1314	-42.44	-38.75	37.62	-0.0018
20190101-20191231	10.0	-10.0	-0.81	-4.11	7.1	-0.65(-0.041)	19.68	0.48	-23.44	-0.49	1677 X 1933	15.21	26.71	-23.52	-0.0008
20200101-20200331	10.0	-10.01	-1.42	-30.57	9.14	-3.85(-0.243)	15.64	0.38	-134.06	-7.04	1447 X 2235	-42.73	-12.47	-18.54	-0.0088
20100104-20200331	9.99	-10.0	-11.31	-5.68	7.02	-0.82(-0.052)	114.81	0.47	-32.37	-0.73	1332 X 1403	-2.72	4.85	-8.64	-0.0015

Figure 1: 回测结果

-0.3073	3.48	4.27	2.08	4.56	180	211919_my_11	
-0.3171	3.72	2.65	1.38	4.28	105	214823_pv_model_3_gen4_191114_178	
-0.3946	2.41	4.93	2.78	1.53	105	214819_pv_model_2_mod_gen2_191114_42	

Figure 2: 相关性结果

2 Alpha152

$$Alpha = SMA(MEAN(DELAY(SMA(DELAY(CLOSE/DELAY(CLOSE, 9), 1), 9, 1), 1), 12) -$$
$$MEAN(DELAY(SMA(DELAY(CLOSE/DELAY(CLOSE, 9), 1), 9, 1), 1), 26), 9, 1) \tag{2}$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-10.0	-0.14	-0.7	12.75	-0.19(-0.012)	8.85	0.51	-2.19	-0.04	870 X 895	11.55	14.01	-12.95	-0.0001
20110101-20111231	10.0	-10.0	-0.91	-4.66	12.28	-1.8(-0.114)	11.61	0.43	-15.17	-1.11	1059 X 1044	-41.7	-39.34	32.38	-0.0088
20120101-20121231	10.0	-10.0	-1.74	-8.96	12.31	-3.13(-0.198)	18.13	0.46	-29.13	-2.67	1172 X 1175	-5.22	3.25	-12.71	-0.0144
20130101-20131231	10.0	-10.0	-1.89	-9.92	12.52	-2.97(-0.188)	19.75	0.43	-31.68	-2.64	1212 X 1233	12.84	19.03	-32.67	-0.0125
20140101-20141231	10.0	-10.0	0.14	0.72	12.33	0.21(0.013)	8.72	0.51	2.34	0.05	1258 X 1239	35.05	35.54	-33.6	-0.0012
20150101-20151231	9.99	-10.0	-6.01	-30.76	12.54	-3.52(-0.223)	69.69	0.41	-98.17	-5.52	1380 X 1302	40.2	46.78	-101.72	-0.0202
20160101-20161231	10.0	-10.0	-0.16	-0.82	12.23	-0.15(-0.009)	14.28	0.49	-2.67	-0.04	1622 X 1223	-21.04	-15.42	19.4	-0.0044
20170101-20171231	10.0	-10.0	-0.54	-2.75	12.65	-0.39(-0.024)	14.33	0.46	-8.7	-0.18	1946 X 1251	-25.52	0.88	20.02	-0.0089
20180101-20181231	10.0	-10.0	-1.86	-9.6	12.7	-2.64(-0.167)	20.94	0.4	-30.21	-2.3	1842 X 1656	-56.17	-38.75	36.98	-0.0114
20190101-20191231	10.0	-10.0	-1.31	-6.7	12.91	-1.99(-0.126)	17.2	0.44	-20.76	-1.43	1849 X 1752	10.53	26.71	-23.92	-0.0074
20200101-20200331	10.0	-10.0	0.43	9.21	12.78	1.87(0.118)	3.71	0.55	28.82	1.59	1777 X 1895	-13.42	-12.47	31.82	0.0041
20100104-20200331	10.0	-10.0	-13.98	-7.02	12.53	-1.44(-0.091)	154.26	0.46	-22.42	-1.08	1430 X 1292	-4.18	4.85	-9.86	-0.0086

Figure 3: 回测结果

-0.4693	3.32	3.85	-0.54	3.1	134	213796_v1v2_n_191004_21	
-0.4749	4.41	9.61	1.63	2.56	105	214830_pv_model_3_mod_gen2_191114_55	
-0.4774	3.66	7.37	4.72	2.08	141	213518_h7709	

Figure 4: 相关性结果

3　Alpha153

$$Alpha = (MEAN(CLOSE, 3) + MEAN(CLOSE, 6) + MEAN(CLOSE, 12) + MEAN(CLOSE, 24))/4 \qquad (3)$$

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dates              long(M) short(M) pnl(M)  %ret   %tvr   shrp (IR)       %dd    %win  bpmrgn fitness  Coverage     %posret %inxret %negret IC
20100104-20101231  10.0    -10.0    -2.42   -12.49 0.99   -1.91(-0.121)   26.07  0.38  -504.22 -6.78   518 X 1265   -1.19   14.01   -23.8   -0.0041
20110101-20111231  10.0    -10.0    -0.38   -1.96  0.54   -0.4(-0.025)    12.3   0.48  -146.04 -0.76   602 X 1516   -38.93  -39.34  35.0    -0.0008
20120101-20121231  10.0    -10.0    -0.43   -2.21  0.39   -0.47(-0.03)    16.52  0.45  -228.13 -1.12   628 X 1729   1.13    3.25    -5.54   -0.0013
20130101-20131231  10.0    -10.0    -1.27   -6.67  0.44   -1.15(-0.073)   16.86  0.45  -610.63 -4.49   630 X 1815   14.09   19.03   -27.42  -0.0022
20140101-20141231  9.99    -10.0    -0.25   -1.26  0.64   -0.2(-0.013)    15.32  0.47  -81.64  -0.29   846 X 1657   36.04   35.54   -38.62  -0.0009
20150101-20151231  10.0    -10.0    -1.82   -9.32  1.14   -0.83(-0.052)   56.94  0.47  -326.31 -2.36   897 X 1796   66.33   46.78   -84.99  -0.0013
20160101-20161231  10.0    -10.0    -1.53   -7.85  0.55   -1.4(-0.089)    31.35  0.39  -573.62 -5.31   897 X 1959   -31.31  -15.42  15.6    -0.0021
20170101-20171231  10.0    -10.0    -0.27   -1.39  0.54   -0.29(-0.019)   9.3    0.46  -102.94 -0.47   862 X 2360   -24.78  0.88    22.0    -0.001
20180101-20181231  10.0    -10.0    -1.28   -6.58  0.56   -1.32(-0.083)   22.07  0.48  -469.79 -4.51   817 X 2688   -49.19  -38.75  36.02   -0.0015
20190101-20191231  10.0    -10.0    -0.6    -3.09  0.63   -0.62(-0.039)   14.19  0.44  -197.37 -1.37   846 X 2761   22.23   26.71   -28.42  -0.0011
20200101-20200331  10.0    -10.0    -0.59   -12.62 0.68   -2.09(-0.132)   8.59   0.33  -737.55 -8.97   873 X 2808   -33.5   -12.47  8.25    -0.0043

20100104-20200331  10.0    -10.0    -10.85  -5.44  0.64   -0.87(-0.055)   113.03 0.44  -339.39 -2.53   758 X 1975   -1.33   4.85    -9.57   -0.0017
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Figure 5: 回测结果

Figure 6: 相关性结果

4　Alpha154

$$Alpha = (((VWAP - MIN(VWAP, 16))) < (CORR(VWAP, MEAN(VOLUME, 180), 18))) \qquad (4)$$

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dates              long(M) short(M) pnl(M)  %ret   %tvr    shrp (IR)       %dd    %win  bpmrgn fitness  Coverage     %posret %inxret %negret IC
20100104-20101231  5.17    -5.17    1.73    8.92   91.94   1.34(0.085)     17.84  0.29  7.51   0.42     22 X 22      -63.99  -21.97  98.52   0.0009
20110101-20111231  5.16    -5.13    1.5     9.85   75.49   1.4(0.088)      19.91  0.28  7.89   0.51     21 X 29      2.62    -8.7    27.26   0.018
20120101-20121231  10.0    -10.0    1.95    10.01  98.77   0.92(0.058)     12.44  0.54  4.07   0.29     42 X 48      16.01   3.25    4.09    0.0059
20130101-20131231  10.0    -10.0    0.58    3.03   112.01  0.57(0.036)     8.54   0.52  1.08   0.09     643 X 698    23.15   19.03   -17.09  0.0011
20140101-20141231  10.0    -9.97    -1.47   -7.49  141.6   -1.43(-0.091)   16.98  0.43  -2.12  -0.33    637 X 703    22.55   35.54   -37.66  -0.0036
20150101-20151231  10.01   -9.99    1.98    10.03  129.5   1.19(0.075)     13.42  0.51  3.13   0.33     378 X 465    51.18   46.78   -30.99  0.0025
20160101-20161231  10.0    -10.0    -0.67   -3.46  133.34  -0.62(-0.039)   14.47  0.48  -1.03  -0.1     557 X 574    -25.1   -15.42  18.25   -0.0009
20170101-20171231  10.0    -9.99    -0.93   -4.77  139.92  -0.94(-0.059)   17.28  0.47  -1.36  -0.17    828 X 915    -27.9   0.88    18.4    -0.0017
20180101-20181231  9.99    -10.0    0.36    1.8    141.06  0.29(0.018)     8.51   0.49  0.53   0.03     1114 X 1182  -31.29  -38.75  35.02   0.0007
20190101-20191231  10.01   -10.0    -1.62   -7.75  136.67  -1.2(-0.076)    18.19  0.47  -2.42  -0.29    1460 X 1577  26.54   26.71   -43.15  -0.0009
20200101-20200331  10.0    -9.99    -0.12   -2.51  144.05  -0.44(-0.028)   4.58   0.53  -0.72  -0.06    1599 X 1658  -26.82  -12.47  21.66   0.0009

20100104-20200331  9.06    -9.05    3.29    1.9    124.5   0.27(0.017)     41.55  0.45  0.59   0.03     594 X 646    1.84    4.35    1.81    0.0022
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Figure 7: 回测结果

Corr	ISSharpe	SemiOS	OSSharpe	Fitness	OSdays	ID
0.1046	3.31	5.88	2.1	1.76	105	214858_pv_model_6_gen6_191114_146
0.0908	5.0	2.52	-0.97	1.69	180	211938_my_H1247
0.0899	3.8	6.89	1.62	2.43	106	214795_pv_model_1_gen6_191114_225

Figure 8: 相关性结果

该因子没逻辑，没作用。

5 Alpha155

$$Alpha = SMA(VOLUME, 13, 2) - SMA(VOLUME, 27, 2) - SMA(SMA(VOLUME, 13, 2) - SMA(VOLUME, 27, 2), 10, 2) \tag{5}$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-9.99	-1.75	-9.07	23.57	-1.78(-0.113)	19.9	0.38	-15.39	-1.11	890 X 926	-16.14	14.01	-1.99	-0.0065
20110101-20111231	10.0	-9.99	-1.63	-8.33	21.08	-2.33(-0.147)	20.34	0.43	-15.81	-1.47	1068 X 1078	-51.76	-39.34	35.12	-0.0073
20120101-20121231	10.0	-9.99	-2.44	-12.58	21.81	-3.47(-0.22)	26.52	0.37	-23.06	-2.64	1106 X 1267	-19.57	3.25	-5.57	-0.012
20130101-20131231	10.0	-9.97	-1.82	-9.55	22.97	-1.85(-0.117)	18.34	0.45	-16.65	-1.2	1206 X 1240	-4.77	19.03	-14.37	-0.008
20140101-20141231	10.0	-9.96	0.7	3.69	23.61	0.68(0.043)	11.22	0.48	6.1	0.27	1172 X 1340	53.91	35.54	-46.91	-0.0006
20150101-20151231	10.01	-9.8	-0.36	-1.89	21.91	-0.25(-0.016)	28.79	0.46	-3.42	-0.07	1428 X 1277	18.06	46.78	-22.24	-0.0008
20160101-20161231	9.98	-9.95	-1.22	-6.24	22.66	-1.62(-0.102)	18.58	0.41	-11.04	-0.85	1336 X 1529	-32.53	-15.42	20.1	-0.0051
20170101-20171231	9.98	-9.97	-0.75	-3.84	20.93	-0.82(-0.052)	9.89	0.47	-7.31	-0.35	1679 X 1570	-27.82	0.88	20.2	-0.0025
20180101-20181231	9.99	-9.95	-2.87	-14.71	21.86	-4.01(-0.254)	32.02	0.37	-27.06	-3.29	1720 X 1793	-72.2	-38.75	42.87	-0.0127
20190101-20191231	9.99	-9.98	-3.79	-19.46	19.79	-5.35(-0.338)	39.24	0.35	-39.34	-5.3	1756 X 1861	-16.29	26.71	-22.63	-0.0149
20200101-20200331	10.0	-9.98	-1.36	-29.35	22.55	-5.4(-0.342)	15.13	0.34	-52.04	-6.16	1567 X 2121	-82.17	-12.47	23.56	-0.0218
20100104-20200331	10.0	-9.96	-17.28	-8.68	22.03	-1.8(-0.114)	174.99	0.42	-15.8	-1.13	1342 X 1406	-18.4	4.85	1.03	-0.0074

Figure 9: 回测结果

-0.599	3.14	5.97	5.13	1.53	108	214732_fac101
-0.6029	2.7	6.47	5.79	1.68	141	213518_h4838
-0.6344	2.85	6.6	5.96	1.45	180	211930_h_ori144

Histogram

Figure 10: 相关性结果

6 Alpha156

$$Alpha = (MAX(RANK(DECAYLINEAR(DELTA(VWAP, 5), 3)),$$
$$RANK(DECAYLINEAR(((DELTA(((OPEN * 0.15) +$$
$$(LOW * 0.85)), 2)/((OPEN * 0.15) + (LOW * 0.85))) * -1), 3))) * -1) \tag{6}$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-10.0	-0.12	-0.63	72.45	-0.26(-0.016)	8.43	0.5	-0.35	-0.02	837 X 969	13.19	14.01	-14.46	-0.0003
20110101-20111231	10.0	-10.0	0.67	3.45	71.45	1.83(0.116)	2.0	0.54	1.93	0.4	983 X 1155	-31.7	-39.34	38.6	0.0059
20120101-20121231	10.0	-10.0	0.87	4.47	70.94	2.17(0.137)	3.29	0.58	2.52	0.54	1089 X 1279	9.17	3.25	-0.23	0.0087
20130101-20131231	10.0	-9.99	0.58	3.03	71.43	1.12(0.071)	2.85	0.53	1.7	0.23	1137 X 1309	27.7	19.03	-21.66	0.004
20140101-20141231	10.0	-9.99	0.56	2.88	71.08	1.2(0.076)	4.0	0.54	1.62	0.24	1166 X 1343	39.24	35.54	-33.54	0.0026
20150101-20151231	10.0	-9.95	1.88	9.64	69.75	1.12(0.071)	12.49	0.56	5.53	0.42	1255 X 1448	82.34	46.78	-63.48	0.0111
20160101-20161231	10.01	-9.93	1.99	10.2	70.79	2.53(0.16)	4.6	0.62	5.77	0.96	1332 X 1533	-2.9	-15.42	23.43	0.0142
20170101-20171231	10.0	-9.95	0.49	2.54	70.29	0.94(0.059)	3.88	0.52	1.45	0.18	1509 X 1738	-16.75	0.88	21.93	0.0023
20180101-20181231	10.01	-9.98	1.0	5.17	70.85	2.14(0.136)	3.0	0.56	2.92	0.58	1615 X 1897	-35.82	-38.75	46.3	0.0088
20190101-20191231	10.0	-9.98	2.04	10.46	69.42	4.94(0.313)	1.82	0.64	6.03	1.92	1674 X 1941	31.55	26.71	-10.67	0.0151
20200101-20200331	10.0	-9.98	0.63	13.6	67.58	4.43(0.28)	3.2	0.6	8.06	1.99	1709 X 1979	-1.91	-12.47	29.16	0.0168
20100104-20200331	10.0	-9.98	10.59	5.33	70.77	1.45(0.092)	12.49	0.56	3.01	0.4	1271 X 1474	11.28	4.85	-0.64	0.0075

Figure 11: 回测结果

Corr	ISSharpe	SemiOS	OSSharpe	Fitness	OSdays	ID
0.4566	4.71	5.42	2.15	5.11	180	211930_h_ori13
0.4533	5.61	7.77	7.71	2.69	169	212322_ld1_29
0.4508	2.98	4.51	2.03	2.84	180	211919_my_210

Figure 12: 相关性结果

7 Alpha157

$$Alpha = (RANK(LOG(TSMIN(RANK((-1 * RANK(DELTA(CLOSE, 5)))), 2)))) + \tag{7}$$

$$TSRANK(DELAY((-1 * RET), 6), 5))$$

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calculate simd2 time of paraltet 1.13078202898293
dates           long(M) short(M) pnl(M)  %ret   %tvr   shrp (IR)    %dd   %win  bpmrgn fitness Coverage      %posret %inxret %negret IC
20100104-20101231 10.0   -10.0    5.19    26.83  89.49  7.32(0.463)  2.39  0.71  11.99  4.01    906 X 899     42.9    14.01   10.74   0.0451
20110101-20111231 10.0   -10.0    3.09    15.84  88.56  5.47(0.346)  3.03  0.66  7.16   2.31    1070 X 1068   -18.39  -39.34  50.09   0.0314
20120101-20121231 10.0   -9.99    3.9     20.06  88.01  7.01(0.444)  2.39  0.7   9.12   3.35    1182 X 1186   23.73   3.25    16.38   0.0402
20130101-20131231 10.01  -9.99    3.98    20.92  91.87  7.52(0.476)  2.26  0.68  9.11   3.59    1231 X 1216   47.73   19.03   -5.95   0.0343
20140101-20141231 10.01  -9.97    4.12    21.02  91.81  7.93(0.501)  2.28  0.73  9.16   3.79    1257 X 1253   59.31   35.54   -17.44  0.0346
20150101-20151231 10.03  -9.92    4.61    23.83  84.09  2.23(0.141)  24.3  0.62  11.27  1.19    1366 X 1338   101.52  46.78   -54.99  0.0276
20160101-20161231 10.0   -9.95    3.98    20.41  88.83  4.79(0.303)  4.15  0.68  9.21   2.3     1434 X 1431   8.86    -15.42  32.09   0.0341
20170101-20171231 10.0   -9.97    1.28    6.55   92.03  2.07(0.131)  4.34  0.58  2.84   0.55    1631 X 1617   -12.05  0.88    25.2    0.0153
20180101-20181231 9.99   -9.99    2.64    13.58  90.54  4.5(0.285)   2.9   0.62  6.0    1.74    1756 X 1756   -29.65  -38.75  56.81   0.0236
20190101-20191231 10.0   -9.99    2.43    12.47  90.8   4.98(0.315)  3.13  0.62  5.49   1.85    1810 X 1805   32.63   26.71   -7.72   0.0187
20200101-20200331 9.99   -9.99    0.35    7.51   88.77  2.04(0.129)  4.22  0.5   3.38   0.59    1862 X 1826   -8.38   -12.47  23.4    0.0115

20100104-20200331 10.01  -9.98    35.57   17.89  89.58  3.97(0.251)  24.36 0.66  7.98   1.77    1376 X 1368   24.87   4.85    10.87   0.03
```

Figure 13: 回测结果

Corr	ISSharpe	SemiOS	OSSharpe	Fitness	OSdays	ID
0.7688	3.41	6.33	4.7	2.66	180	211919_my_94
0.6959	3.52	6.83	3.15	1.44	105	214896_pv_model_7_mod_gen6_191114_177
0.6912	3.12	3.37	5.02	1.35	104	214975_pv_model_9_gen2_191114_163

Figure 14: 相关性结果

8 Alpha158

$$Alpha = ((HIGH - SMA(CLOSE, 15, 2)) - (LOW - SMA(CLOSE, 15, 2)))/CLOSE \tag{8}$$

```
calculate simd2 time of paraltet 1.13078202898293
dates           long(M) short(M) pnl(M)  %ret    %tvr    shrp (IR)     %dd     %win  bpmrgn fitness Coverage     %posret %inxret %negret  IC
20100104-20101231 10.0   -9.99    -0.91   -4.69   113.46  -1.02(-0.064) 11.62   0.47  -1.66  -0.21   772 X 1044   3.39    14.01   -12.8    -0.0029
20110101-20111231 9.99   -10.0    -1.18   -6.06   109.47  -1.59(-0.1)   14.51   0.48  -2.21  -0.37   880 X 1266   -43.27  -39.34  31.15    -0.0054
20120101-20121231 10.0   -9.99    -0.67   -3.43   109.05  -0.98(-0.062) 15.34   0.47  -1.26  -0.17   949 X 1425   -3.77   3.25    -3.1     -0.002
20130101-20131231 10.0   -9.99    -0.56   -2.94   100.29  -0.56(-0.035) 9.55    0.5   -1.18  -0.1    1000 X 1446  22.1    19.03   -28.01   0.0011
20140101-20141231 9.98   -9.97    -1.22   -6.27   92.71   -1.27(-0.08)  19.65   0.48  -2.69  -0.33   1045 X 1466  34.27   35.54   -46.77   -0.0022
20150101-20151231 10.01  -9.89    -2.57   -13.3   77.23   -0.62(-0.039) 62.43   0.54  -6.85  -0.26   1368 X 1336  64.89   46.78   -92.27   0.0091
20160101-20161231 9.96   -9.85    -2.49   -13.01  87.28   -1.37(-0.087) 25.17   0.46  -5.9   -0.53   1255 X 1610  -27.0   -15.42  1.4      -0.0066
20170101-20171231 9.92   -9.83    -2.11   -10.91  91.54   -2.04(-0.129) 22.66   0.44  -4.78  -0.71   1300 X 1950  -36.11  0.88    14.49    -0.0099
20180101-20181231 9.97   -9.95    -1.48   -7.62   97.49   -1.36(-0.086) 16.47   0.45  -3.13  -0.38   1406 X 2107  -60.12  -38.75  44.99    -0.006
20190101-20191231 9.97   -9.93    -5.52   -28.42  100.0   -6.01(-0.38)  55.64   0.32  -11.37 -3.2    1348 X 2269  -29.1   26.71   -27.77   -0.0344
20200101-20200331 9.98   -9.91    -0.62   -13.48  95.55   -2.19(-0.139) 12.31   0.48  -5.67  -0.82   1409 X 2280  -31.6   -12.47  4.66     -0.0175

20100104-20200331 9.98   -9.94    -19.33  -9.78   97.8    -1.14(-0.072) 194.88  0.46  -3.99  -0.36   1139 X 1609  -8.03   4.85    -11.47   -0.0062
```

Figure 15: 回测结果

-0.725	3.0	6.19	7.6	2.81	134	213812_gpdl_v1v2_7
-0.7331	4.79	7.68	4.64	3.39	112	214561_fac221
-0.8027	3.23	8.31	8.18	3.76	115	214423_pv_model_5_2_191101_42

Figure 16: 相关性结果

9　Alpha159

$$
\begin{aligned}
Alpha =&((CLOSE - SUM(MIN(LOW, DELAY(CLOSE, 1)), 6))/SUM(MAX(HGIH, DELAY(CLOSE, 1))-\\
&MIN(LOW, DELAY(CLOSE, 1)), 6) * 12 * 24+\\
&(CLOSE - SUM(MIN(LOW, DELAY(CLOSE, 1)), 12))/SUM(MAX(HGIH, DELAY(CLOSE, 1))-\\
&MIN(LOW, DELAY(CLOSE, 1)), 12) * 6 * 24+\\
&(CLOSE - SUM(MIN(LOW, DELAY(CLOSE, 1)), 24))/SUM(MAX(HGIH, DELAY(CLOSE, 1))-\\
&MIN(LOW, DELAY(CLOSE, 1)), 24) * 6 * 24) * 100/(6 * 12 + 6 * 24 + 12 * 24)
\end{aligned}
\tag{9}
$$

```
calculate sima2 time of parattet 1719078302093029
dates            long(M) short(M) pnl(M)  %ret   %tvr    shrp (IR)      %dd    %win  bpmrgn fitness Coverage     %posret %inxret %negret IC
20100104-20101231 10.0   -9.99   -0.91   -4.69  113.46  -1.02(-0.064) 11.62  0.47  -1.66  -0.21   772 X 1044    3.39    14.01   -12.8   -0.0029
20110101-20111231 9.99   -10.0   -1.18   -6.06  109.47  -1.59(-0.1)   14.51  0.48  -2.21  -0.37   880 X 1266    -43.27  -39.34  31.15   -0.0054
20120101-20121231 10.0   -9.99   -0.67   -3.43  109.05  -0.98(-0.062) 15.34  0.47  -1.26  -0.17   949 X 1425    -3.77   3.25    -3.1    -0.002
20130101-20131231 10.0   -9.99   -0.56   -2.94  100.29  -0.56(-0.035) 9.55   0.5   -1.18  -0.1    1000 X 1446   22.1    19.03   -28.01  0.0011
20140101-20141231 9.98   -9.97   -1.22   -6.27  92.71   -1.27(-0.08)  19.65  0.48  -2.69  -0.33   1045 X 1466   34.27   35.54   -46.77  -0.0022
20150101-20151231 10.01  -9.89   -2.57   -13.3  77.23   -0.62(-0.039) 62.43  0.54  -6.85  -0.26   1368 X 1336   64.89   46.78   -92.27  0.0091
20160101-20161231 9.96   -9.85   -2.49   -13.01 87.28   -1.37(-0.087) 25.17  0.46  -5.9   -0.53   1255 X 1610   -27.0   -15.42  1.4     -0.0066
20170101-20171231 9.92   -9.83   -2.11   -10.91 91.54   -2.04(-0.129) 22.66  0.44  -4.78  -0.71   1300 X 1950   -36.11  0.88    14.49   -0.0099
20180101-20181231 9.97   -9.95   -1.48   -7.62  97.49   -1.36(-0.086) 16.47  0.45  -3.13  -0.38   1406 X 2107   -60.12  -38.75  44.99   -0.006
20190101-20191231 9.97   -9.93   -5.52   -28.42 100.0   -6.01(-0.38)  55.64  0.32  -11.37 -3.2    1348 X 2269   -29.1   26.71   -27.77  -0.0344
20200101-20200331 9.98   -9.91   -0.62   -13.48 95.55   -2.19(-0.139) 12.31  0.48  -5.67  -0.82   1409 X 2280   -31.6   -12.47  4.66    -0.0175

20100104-20200331 9.98   -9.94   -19.33  -9.78  97.8    -1.14(-0.072) 194.88 0.46  -3.99  -0.36   1139 X 1609   -8.03   4.85    -11.47  -0.0062
```

Figure 17: 回测结果

```
| -0.725  | 3.0   | 6.19  | 7.6   | 2.81  | 134 | 213812_gpdl_v1v2_7|
| -0.7331 | 4.79  | 7.68  | 4.64  | 3.39  | 112 | 214561_fac221     |
| -0.8027 | 3.23  | 8.31  | 8.18  | 3.76  | 115 | 214423_pv_model_5_2_191101_42|
+---------+-------+-------+-------+-------+-----+----------------+
Histogram
```

Figure 18: 相关性结果

10　Alpha160

$$
Alpha = SMA((CLOSE <= DELAY(CLOSE, 1)?STD(CLOSE, 20) : 0), 20, 1)
\tag{10}
$$

```
dates            long(M) short(M) pnl(M)  %ret   %tvr    shrp (IR)      %dd    %win  bpmrgn  fitness Coverage     %posret %inxret %negret IC
20100104-20101231 10.0   -10.0   -1.86   -9.59  3.71    -1.45(-0.091) 21.71  0.36  -103.45 -2.33   530 X 1283    2.91    14.01   -22.09  -0.003
20110101-20111231 10.0   -10.0   -0.24   -1.22  3.34    -0.25(-0.016) 11.36  0.48  -14.54  -0.15   643 X 1501    -37.96  -39.34  35.53   -0.0003
20120101-20121231 10.0   -10.0   -0.04   -0.23  2.75    -0.05(-0.003) 15.34  0.47  -3.25   -0.01   673 X 1699    3.84    3.25    -4.29   -0.0005
20130101-20131231 10.0   -10.0   -1.64   -8.63  3.66    -1.49(-0.094) 18.36  0.46  -94.27  -2.29   621 X 1826    10.58   19.03   -27.86  -0.0023
20140101-20141231 10.0   -9.99   -0.96   -4.89  4.13    -0.78(-0.049) 14.86  0.43  -47.37  -0.85   853 X 1658    29.76   35.54   -39.56  -0.0015
20150101-20151231 9.99   -9.97   0.66    3.47   4.67    0.36(0.023)   34.96  0.49  29.11   0.31    879 X 1825    87.13   46.78   -80.54  0.0008
20160101-20161231 10.0   -9.95   -1.41   -7.24  3.33    -1.2(-0.076)  31.9   0.38  -87.07  -1.77   908 X 1957    -29.7   -15.42  15.32   -0.0018
20170101-20171231 9.99   -9.95   -0.59   -3.03  4.26    -0.6(-0.038)  12.09  0.41  -28.56  -0.51   919 X 2330    -29.44  0.88    23.46   -0.001
20180101-20181231 10.0   -9.99   -1.54   -7.95  3.46    -1.45(-0.092) 27.05  0.47  -91.71  -2.2    873 X 2640    -53.5   -38.75  37.66   -0.0009
20190101-20191231 10.0   -9.98   -0.85   -4.37  4.03    -0.69(-0.044) 24.53  0.43  -43.33  -0.72   903 X 2713    19.66   26.71   -28.43  -0.0006
20200101-20200331 10.0   -9.98   -0.4    -8.65  4.69    -1.21(-0.077) 8.2    0.36  -73.74  -1.65   928 X 2761    -26.23  -12.47  8.97    -0.0028

20100104-20200331 10.0   -9.98   -8.87   -4.45  3.76    -0.71(-0.045) 95.87  0.44  -47.49  -0.77   784 X 1963    -0.29   4.85    -8.64   -0.0012
```

Figure 19: 回测结果

```
| -0.2070 | 3.43 | 4.55 | 3.67 | 2.58 | 180 | 211919_my_199    |
| -0.2597 | 2.34 | 3.86 | 3.76 | 1.64 | 151 | 213024_agen.ZSAlpha_25|
| -0.2935 | 2.39 | 4.49 | 4.34 | 1.8  | 151 | 213024_agen.ZSAlpha_26|
| -0.3116 | 3.71 | 5.91 | 3.16 | 2.41 | 151 | 213024_agen.ZSAlpha_14|
+---------+---------+---------+---------+--------+--------+----------------+
Histogram
```

Figure 20: 相关性结果