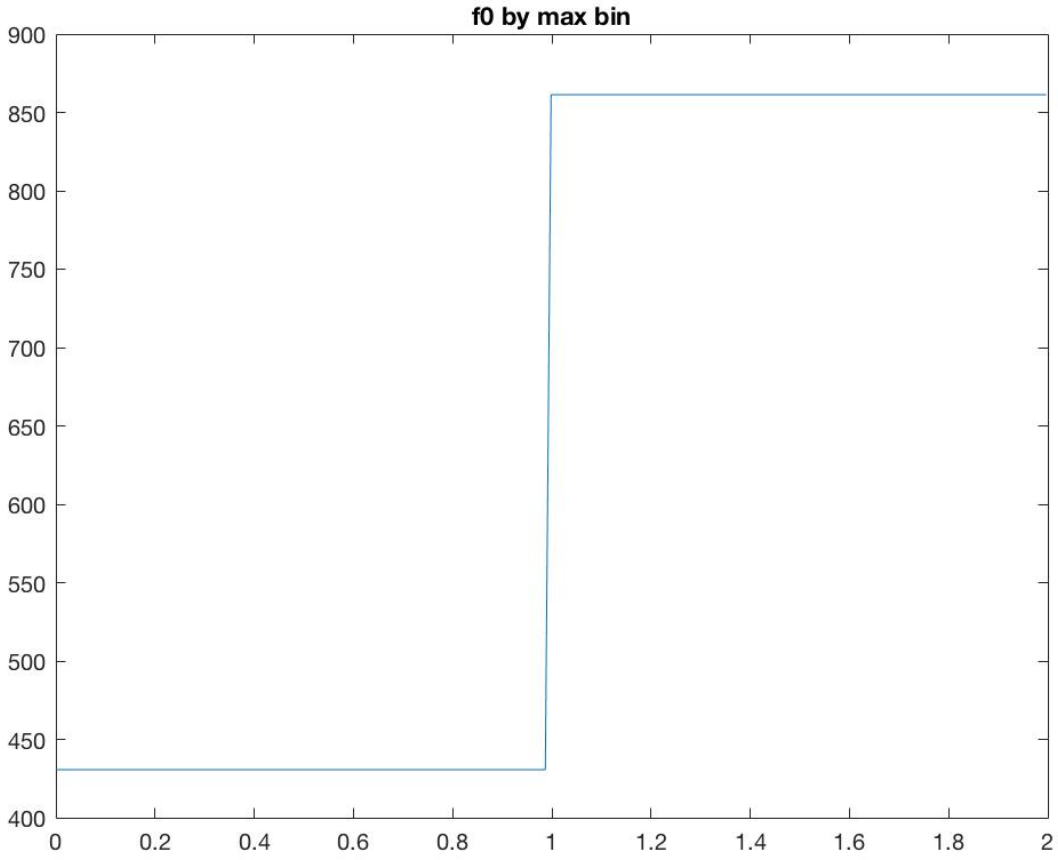
# Report

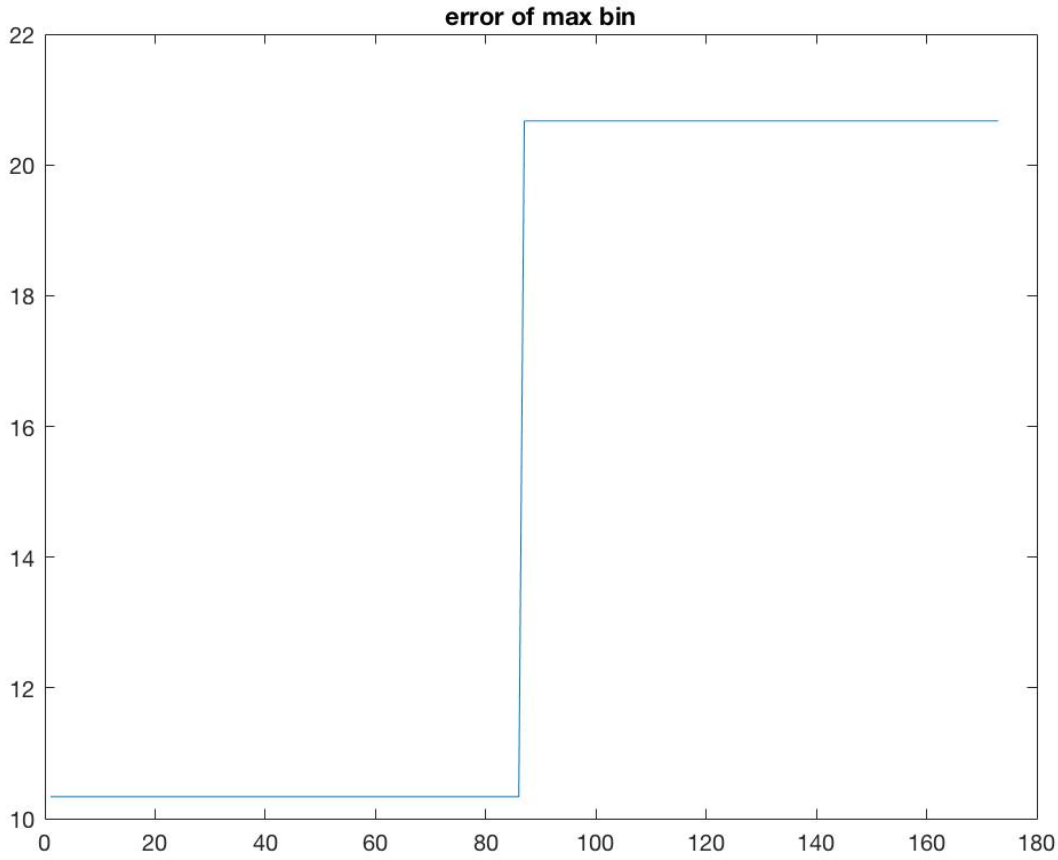
A.3

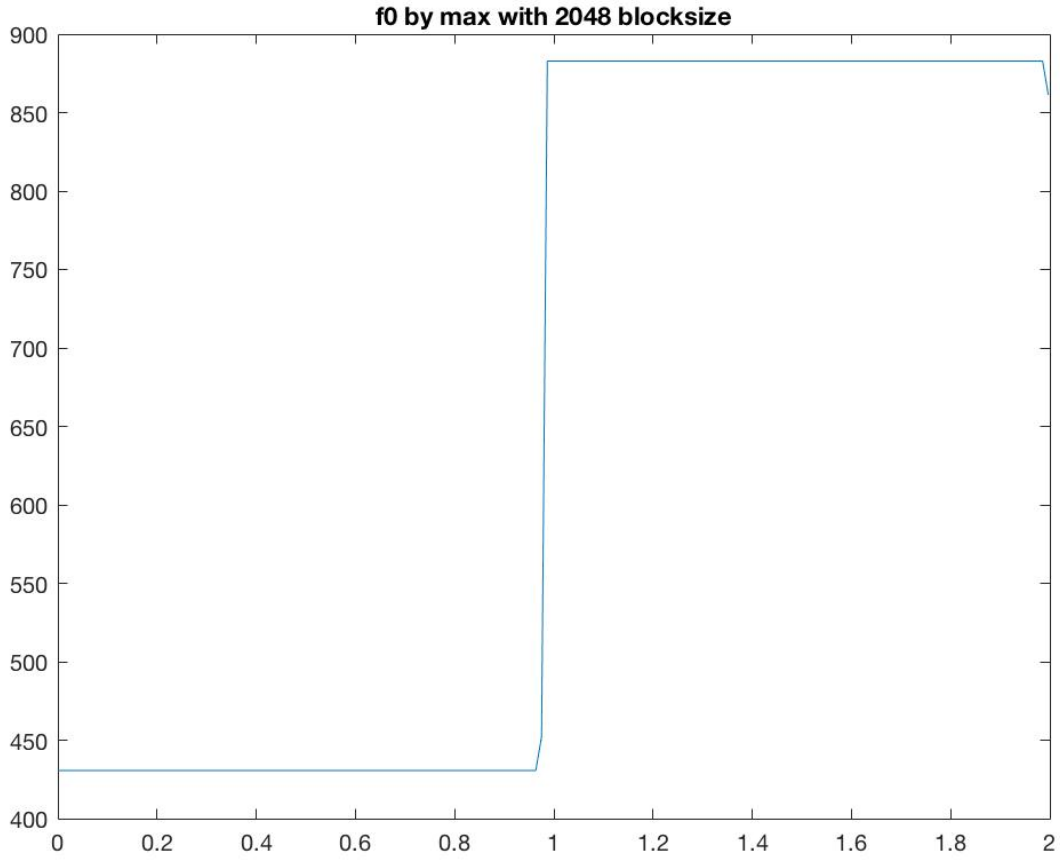
resolution = fs/num_bin = 43.07

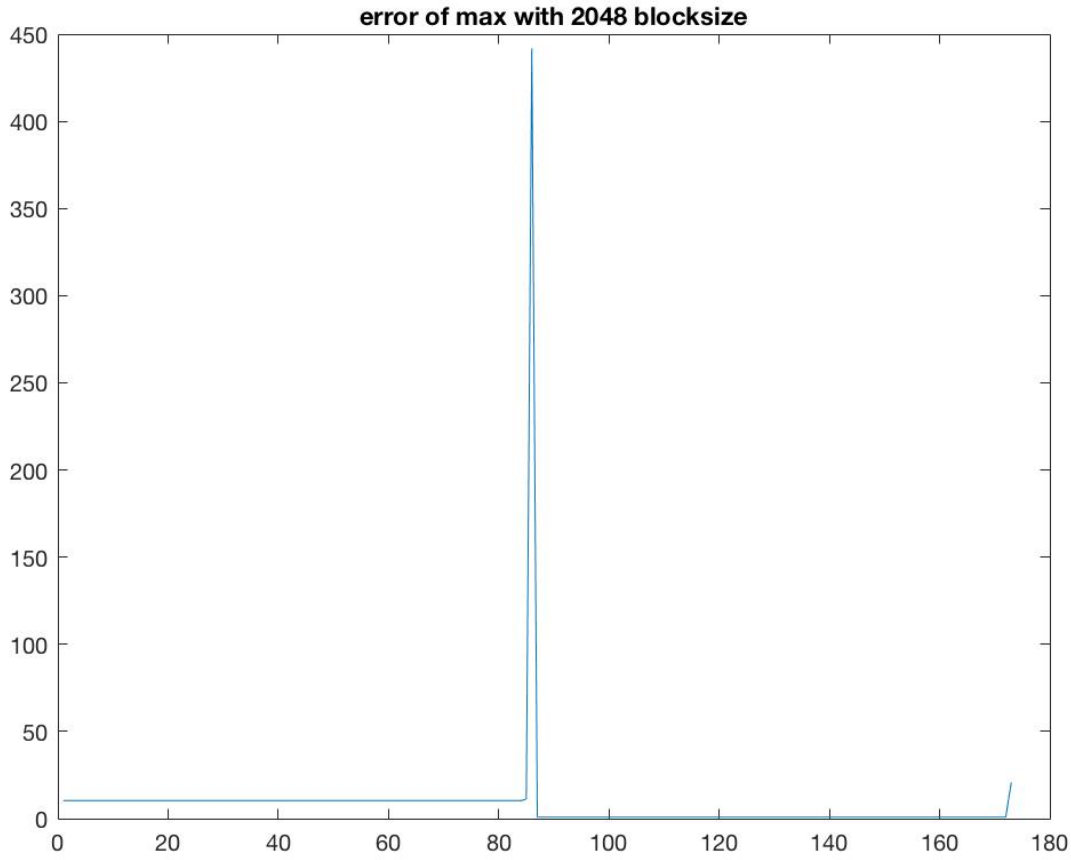
No, we can't improve it without changing block size, the result can be improved by changing sampling rate or resolution, so without changing blocksize, we can't change the resolution, thereby can't improve result without changing blocksize

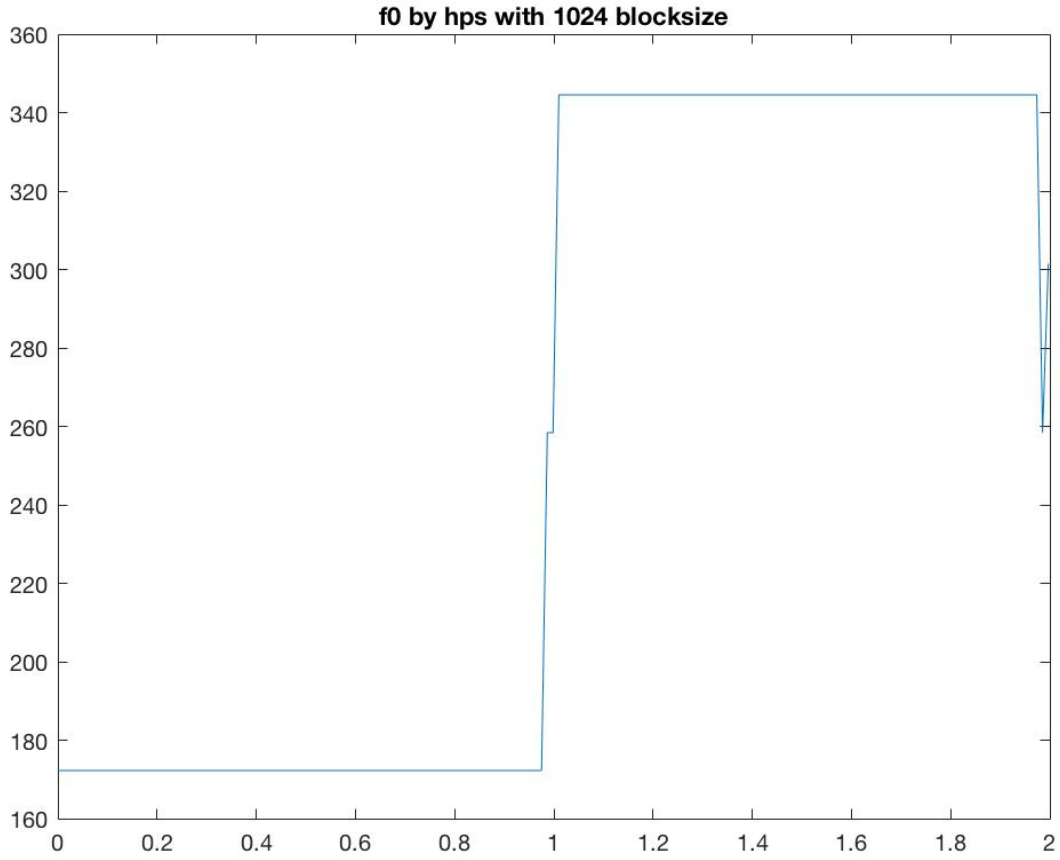
D.1

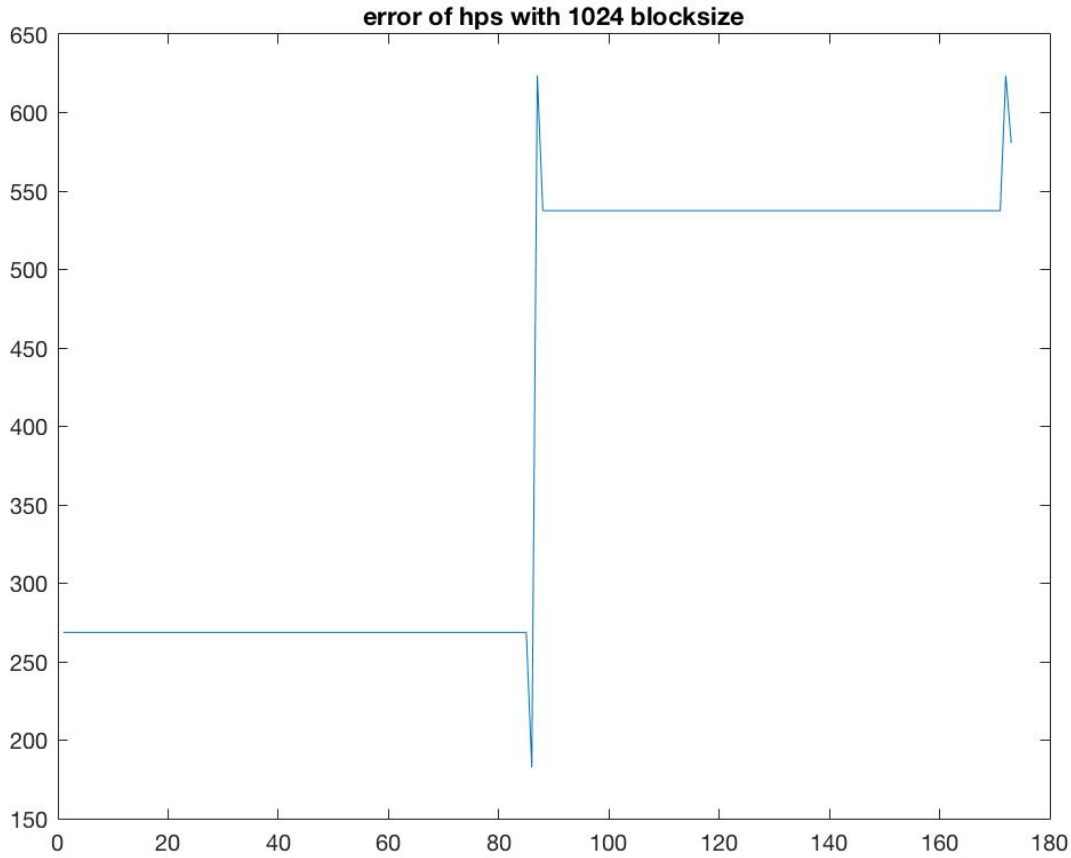



error of max bin
22
20
18
16
14
12
10
0
20
40
60
80
100
120
140
160
180


f0 by max with 2048 blocksize
900
850
800
750
700
650
600
550
500
450
400
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2


error of max with 2048 blocksize
450
400
350
300
250
200
150
100
50
0
0
20
40
60
80
100
120
140
160
180


f0 by hps with 1024 blocksize
360
340
320
300
280
260
240
220
200
180
160
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2




the HPS only works for signal that has harmonics, missing harmonic will influence hps significatly, thus a sin wave that without harmonics will not work with HPS.

D.2

The result is improved by increasing blocksize (lower resolution);

D.3

By max

| **Err_cent** | **Pfp** | **Pfn** |
|---|---|---|
| 1916.35304702099 | 0.605671866447729 | 0.00370577171054318 |

By hps

| **Err_cent** | **Pfp** | **Pfn** |
|---|---|---|
| 918.695480914711 | 1 | 0 |

D.4

Max_-20

| Err_cent | Pfp | Pfn |
|---|---|---|
| 1859.08045582467 | 0.00138888888888889 | 0.347964193088821 |

Max_-40

| Err_cent | Pfp | Pfn |
|---|---|---|
| 1913.61493948174 | 0.155067505929575 | 0.00812313307335579 |

Hps_-20

| Err_cent | Pfp | Pfn |
|---|---|---|
| 799.203437421478 | 0.00138888888888889 | 0.347964193088821 |

Hps_-40

| Err_cent | Pfp | Pfn |
|---|---|---|
| 303.003310915319 | 0.174559843094326 | 0.00672384734682049 |

Acf_-20

| Err_cent | Pfp | Pfn |
|---|---|---|
| 199.405567187889 | 0.00138888888888889 | 0.347964193088821 |

Acf_-40

| Err_cent | Pfp | Pfn |
|---|---|---|
| 890.715398324392 | 0.174559843094326 | 0.00672384734682049 |

Bonus

First use both acf and hps to get f0, then apply the voicing with threshold -40 on hps and -20 on act, replace voiced f0 from acf that greater than 570 with voiced f0 from hps.