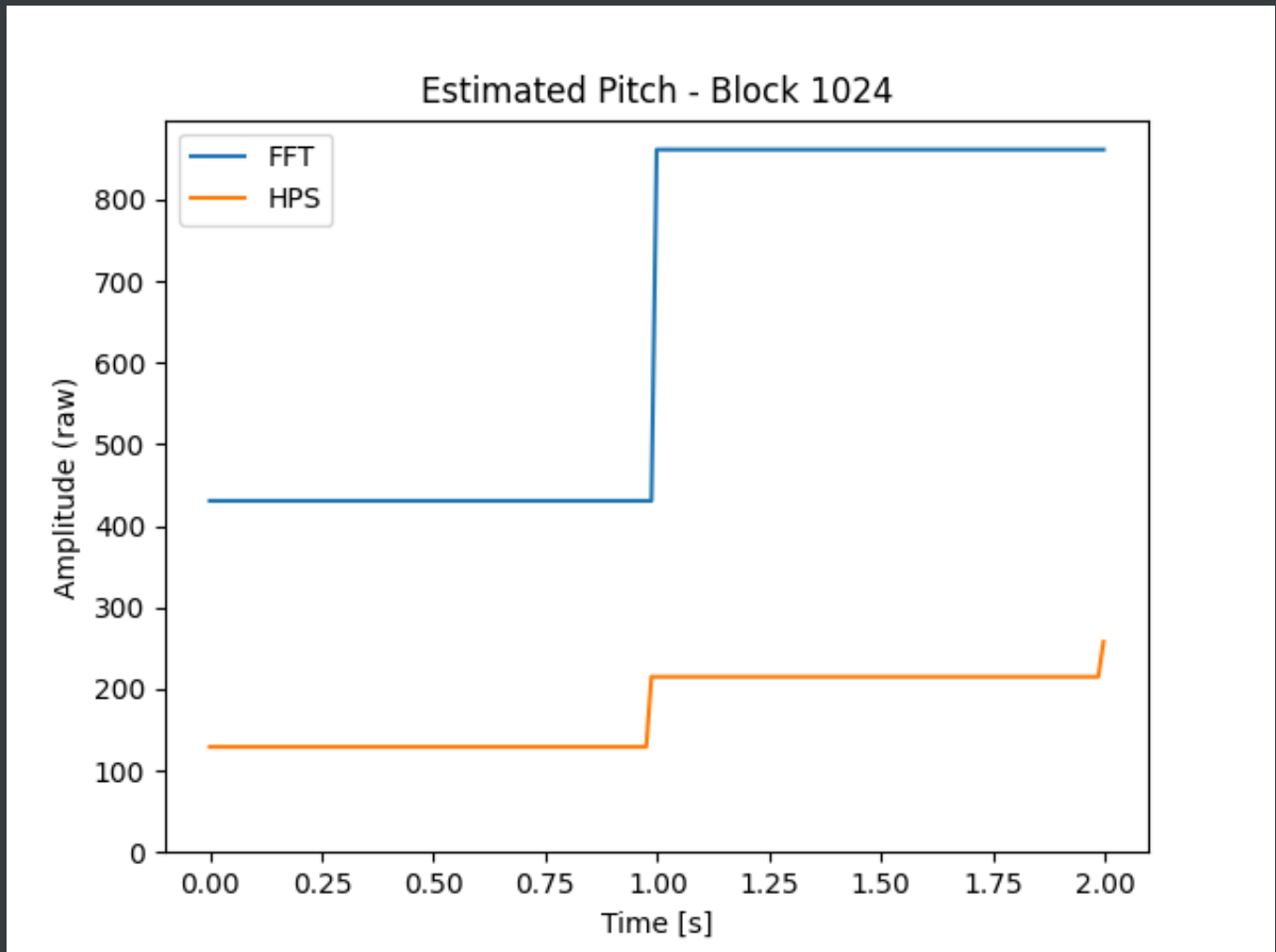


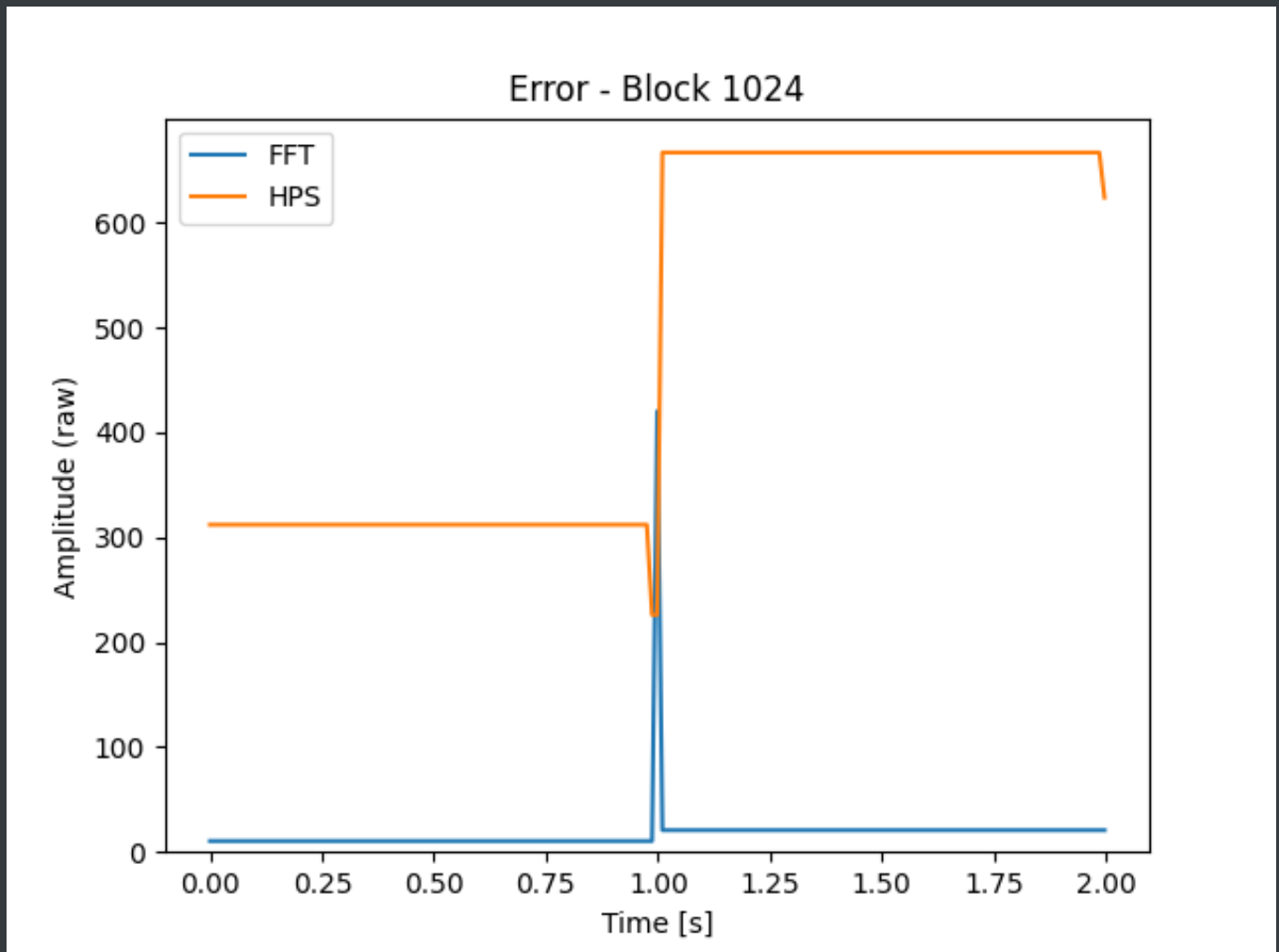
## E. Evaluation

### 1. Why does the HPS method fail with this signal?

F0 curve for HPS & FFT, block size 1024



Error for HPS & FFT

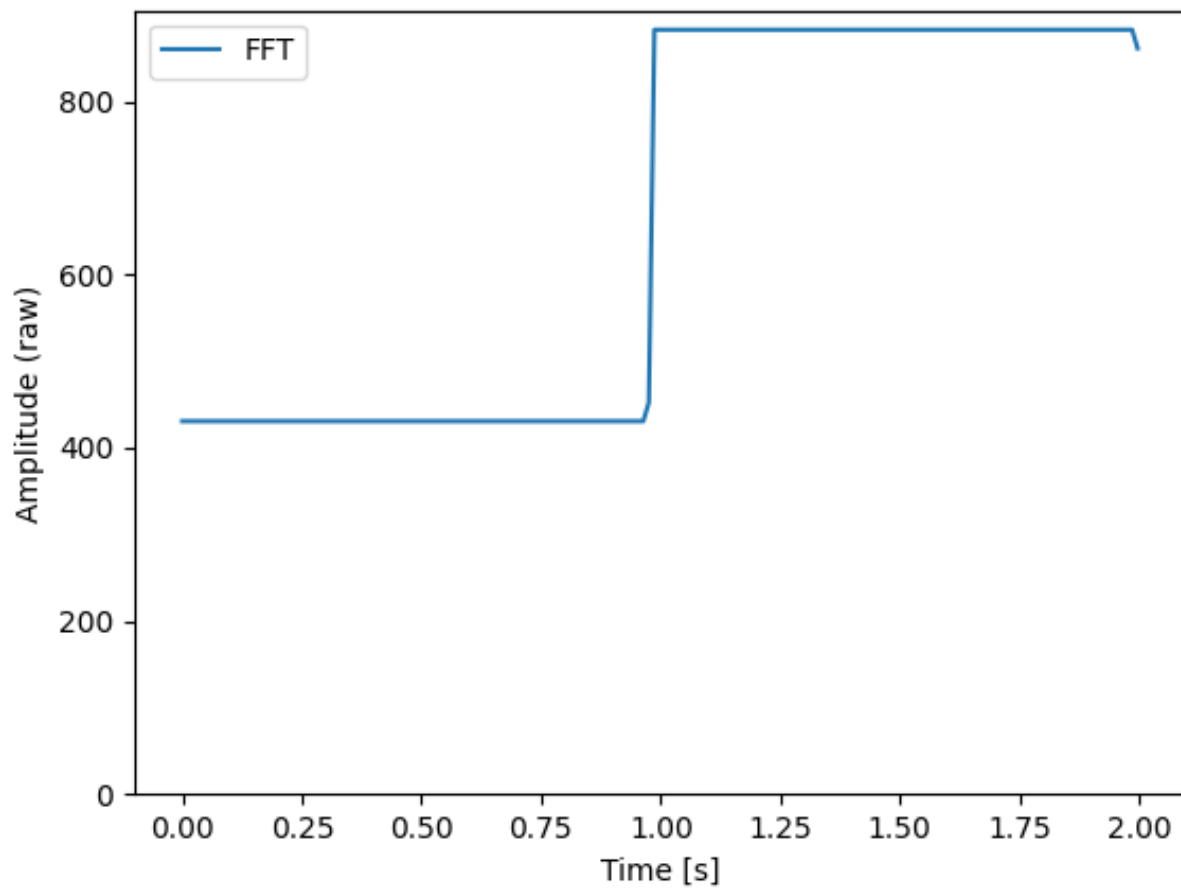


The signal has its fundamental frequency only, without harmonics. As a result, when multiplied with the downsampled spectrogram, the detected frequency will become smaller thus will fail.

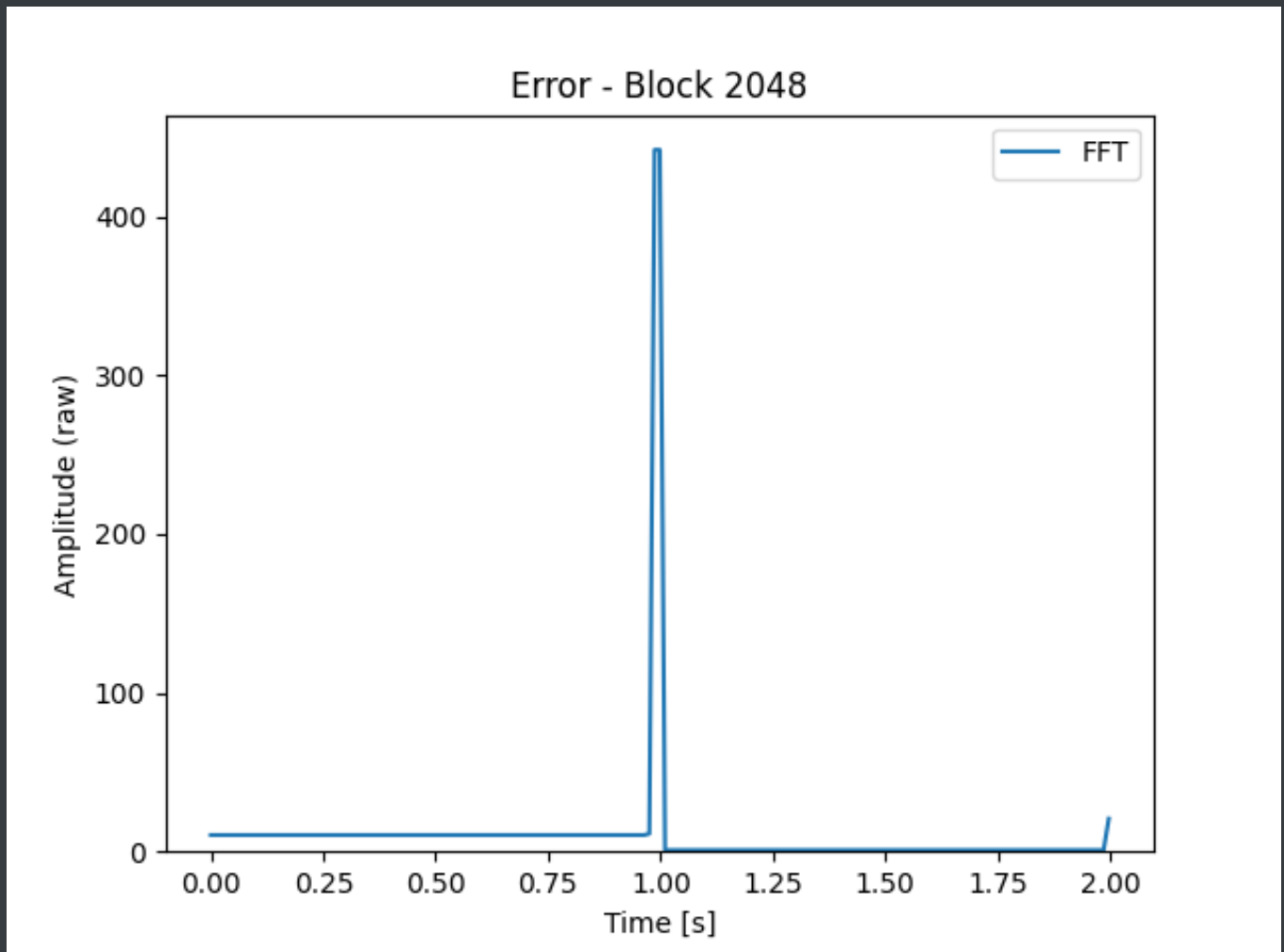
## 2. Do you see any improvement in performance?

F0 curve for HPS & FFT, block size 2048

Estimated Pitch - Block 2048



Error for HPS & FFT



Yes, this is because the frequency resolution ( $f_s / \text{blocksize}$ ) become finer when blocksize is two times of the original.

**3. Report the average performance metrics across the development set for `track_pitch_fftmax()`**

**4. Report the average performance metrics across the development set for `track_pitch_hps()`**

**5. report the results with two values of threshold (threshold = -40, -20)**

For the above 3 questions:

	Error Cent RMS	False Positive Percentage	False Negative Percentage
FFT Results	1694.3987780830735	0.5625	0.0015120967741935483
HPS Results	394.9651522198153	0.14166666666666666	0.018145161290322582
FFT Results -20	1632.6219028948951	0.004166666666666667	0.42086693548387094
FFT Results -40	1695.0905054489017	0.10833333333333334	0.003528225806451613
HPS Results -20	375.7397382122289	0.004166666666666667	0.4213709677419355
HPS Results -40	392.0980423933154	0.09166666666666666	0.01965725806451613
ACF Results -20	80.43031306904199	0.004166666666666667	0.42086693548387094
ACF Results -40	200.91268776740975	0.12083333333333333	0.0025201612903225806