Figure 2.19. Identification of negative peaks for fundamental frequency tracking on a typical original voice signal. The tracking algorithm automatically selects the minima indicated by X and performs a parabolic interpolation to determine the time of minima to a precision of less than one sample. Circles indicate sample points.
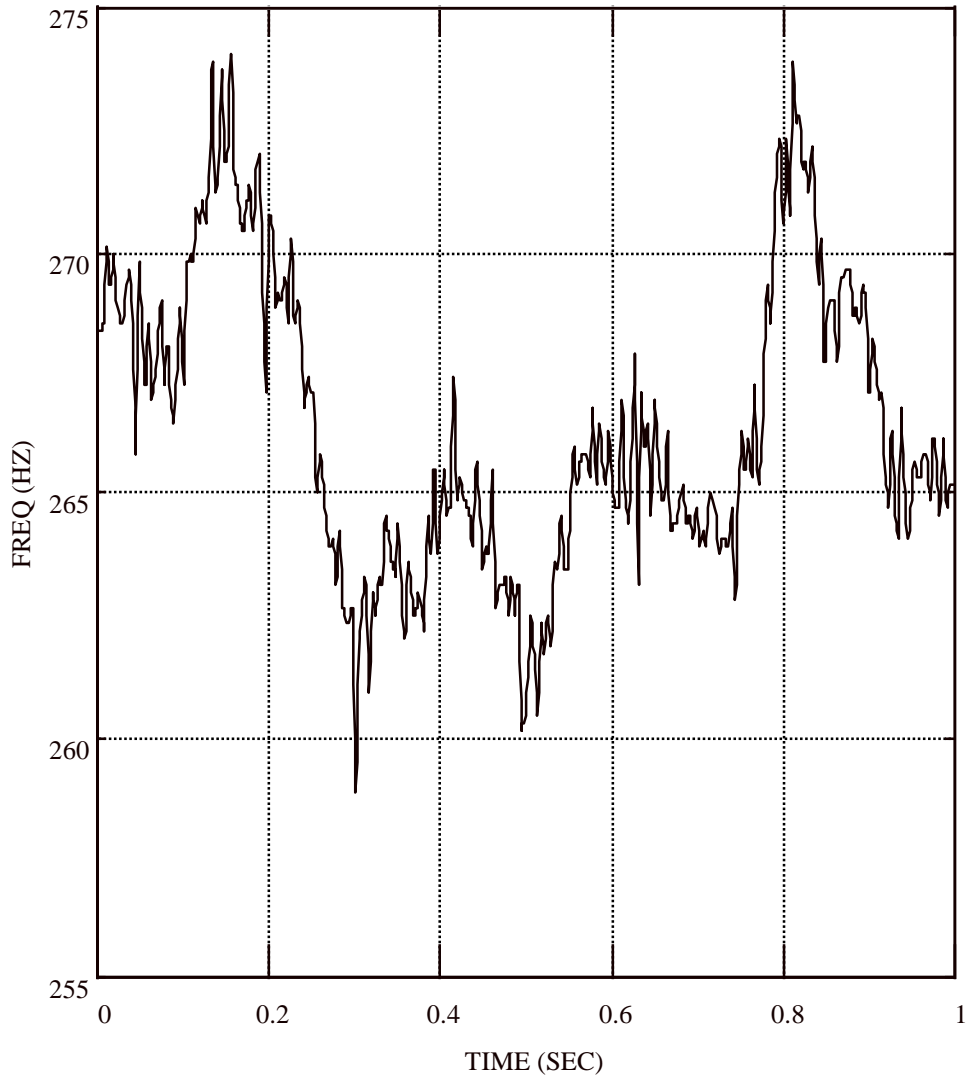
Figure 2.20. A high resolution 1 sec. fundamental frequency track resulting from subsample interpolation. Note lack of fundamental frequency quantization (flat spots) that would occur without interpolation.
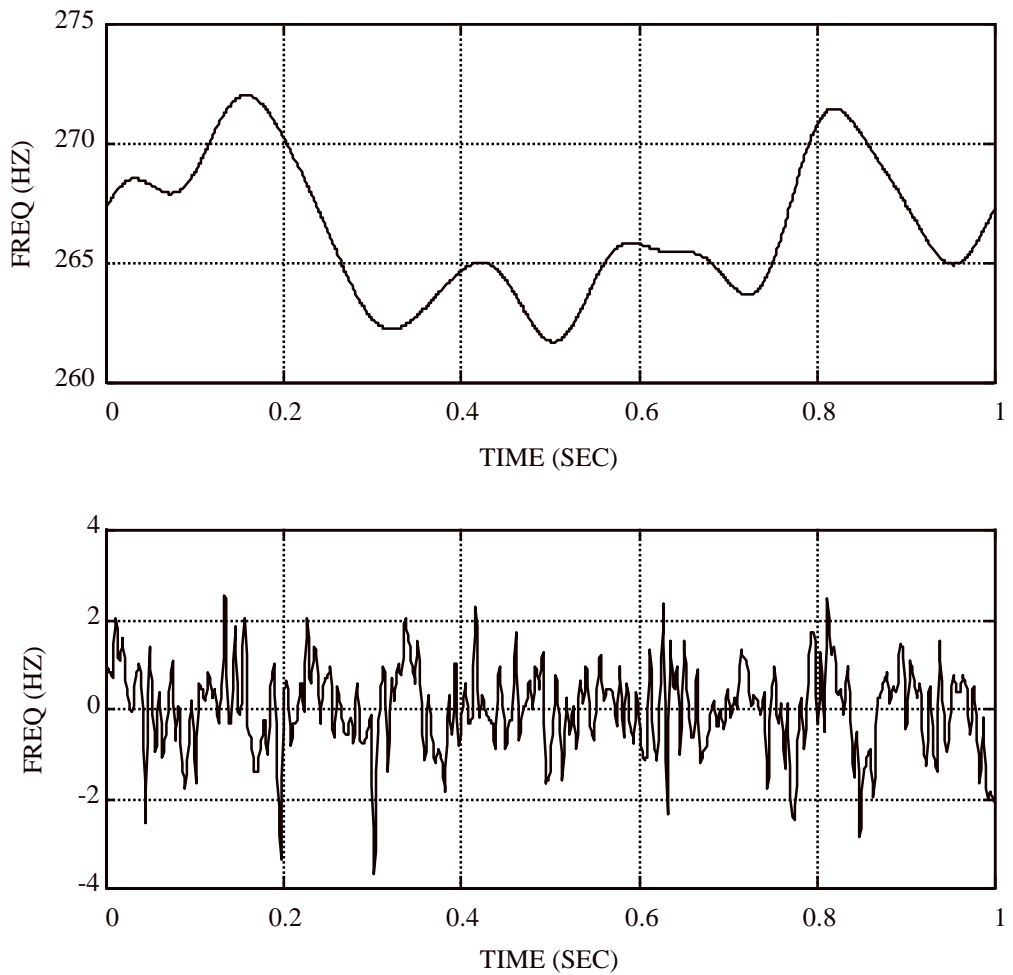
Figure 2.21. The fundamental frequency track of Fig 2.20 is low pass filtered (top part A curve) and high pass filtered (bottom part B curve) yielding the tremor and HFPV time series respectively. A cutoff frequency of 10 Hz is selected.
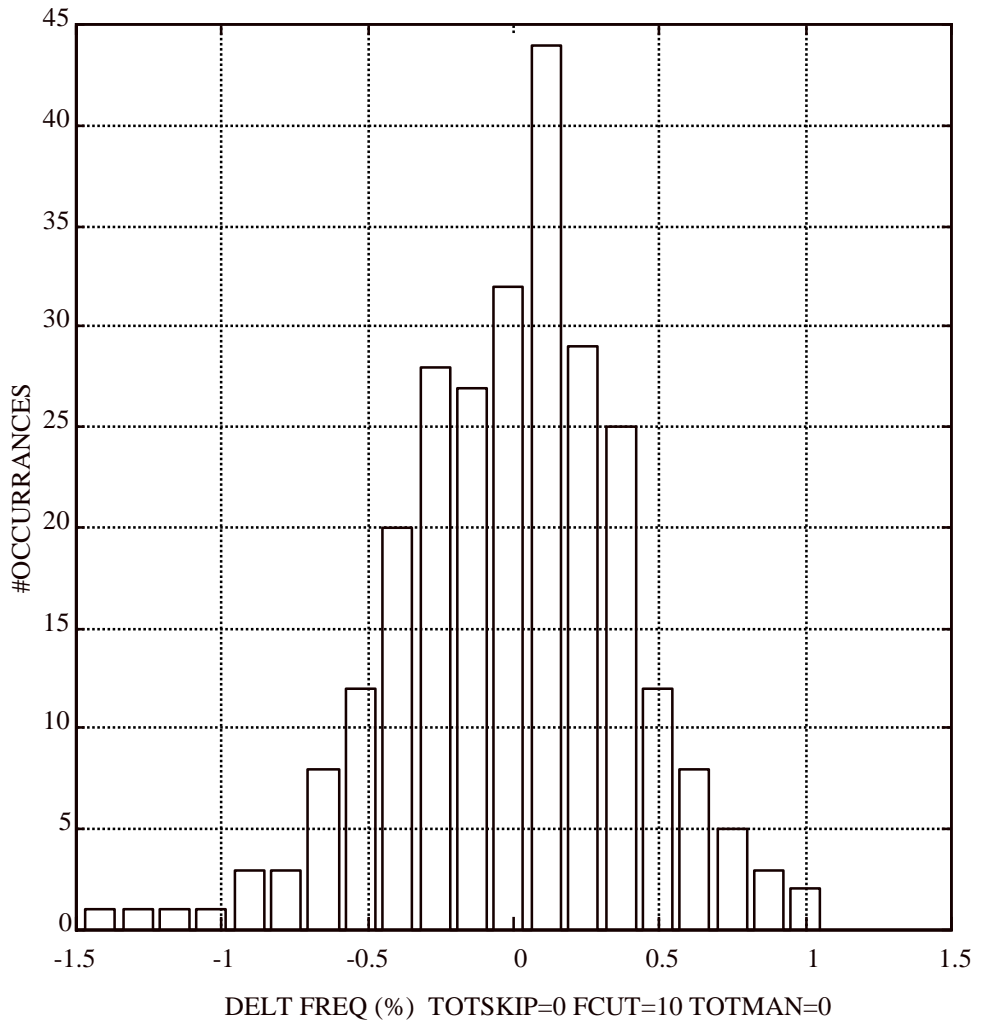
Figure 2.22. Histogram of frequency deviations of the high pass filtered
fundamental frequency time series of Fig 2.20. Successful fundamental frequency
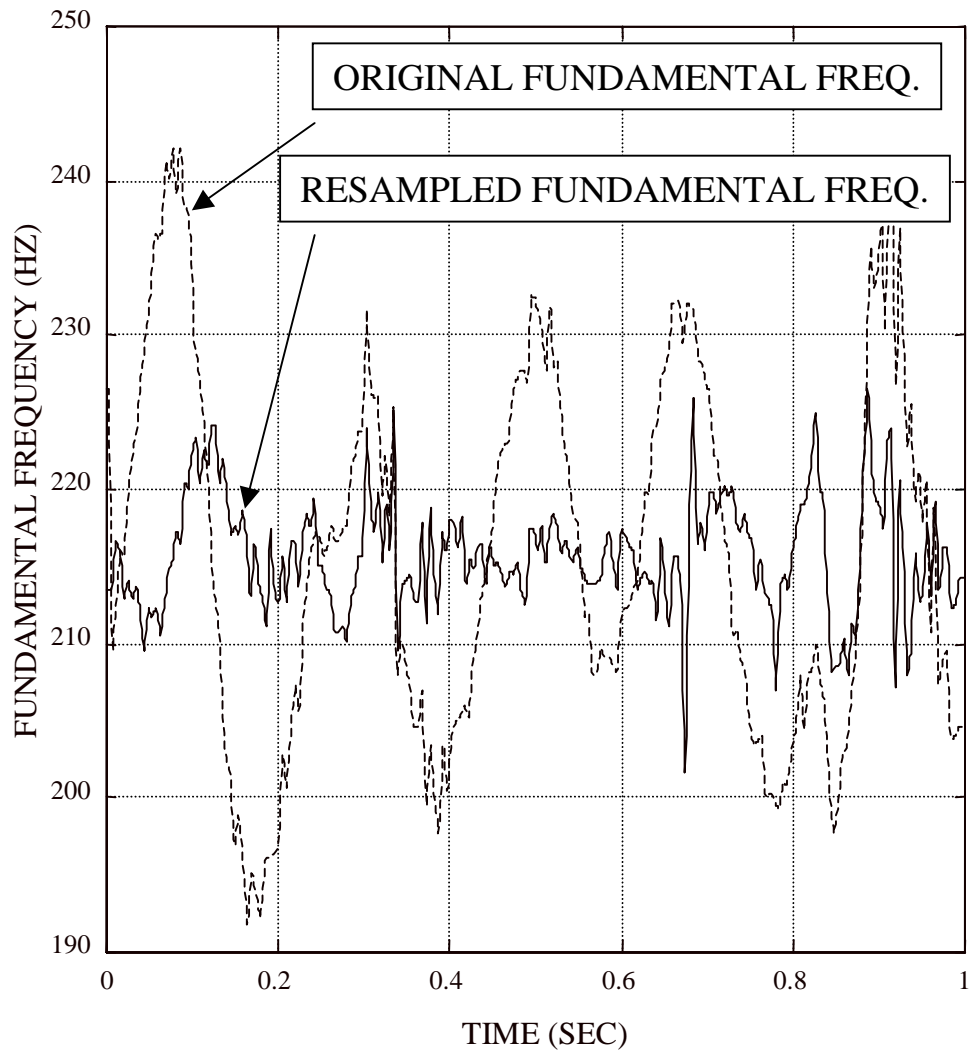tracking yields a Gaussian form distribution.

Figure 2.23. Fundamental frequency time series of original voice and voice re-sampled to remove tremor (low frequency variations). Most of the significant fundamental frequency variation is removed
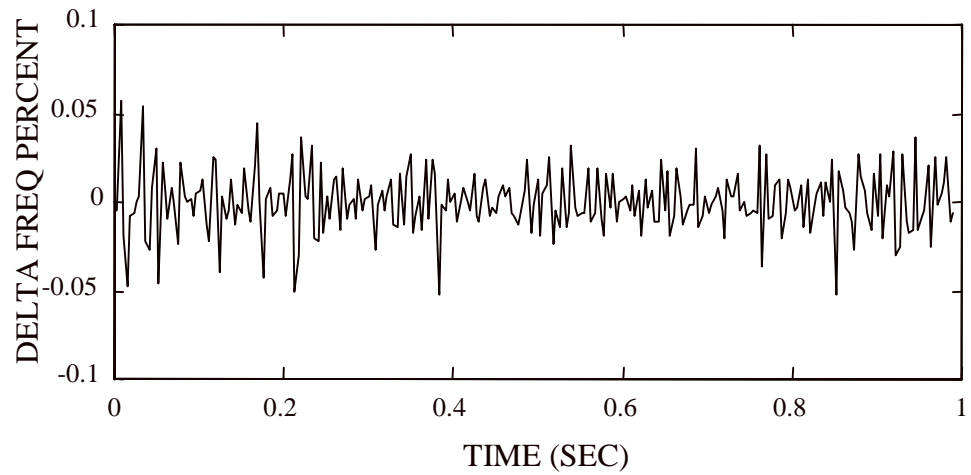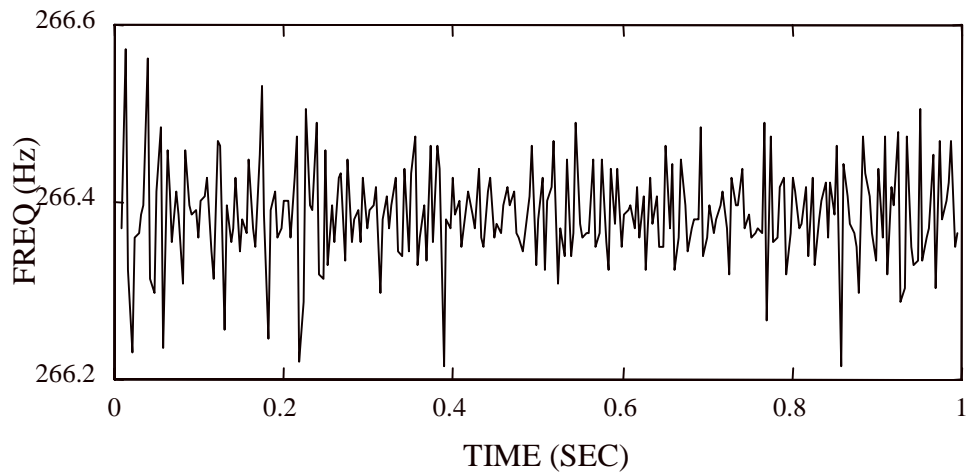
70

Figure 2.24. Fundamental frequency time series of voice re-sampled to remove all fundamental period variations: both HFPV and tremor. In the upper plot the residual variation after removal is shown in Hz; it is less than 0.4 Hz. In the lower plot the residual is shown in percent.