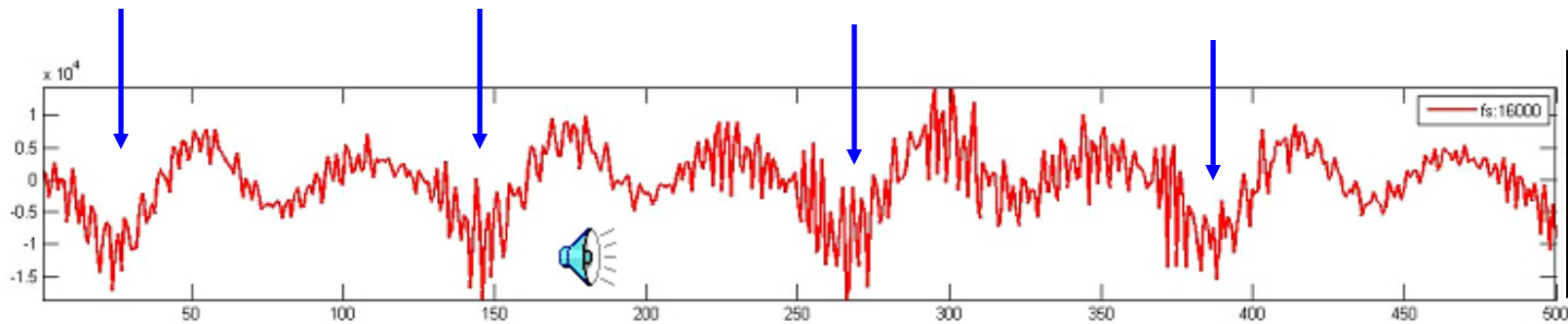
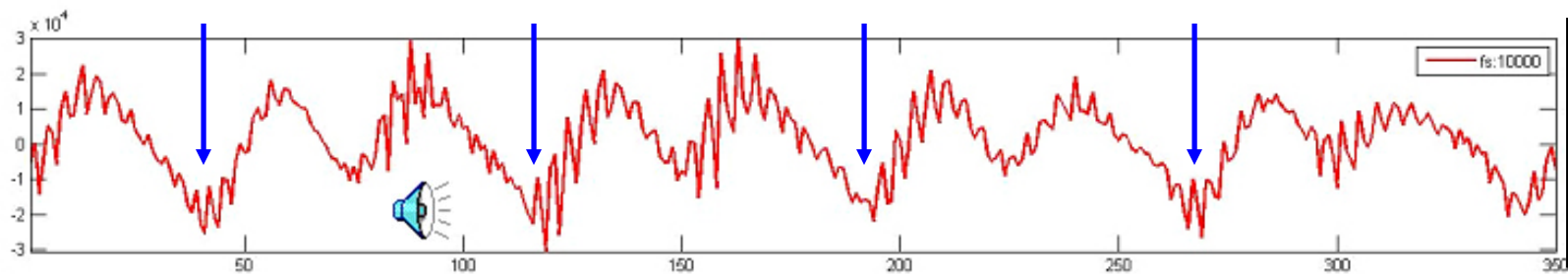


# **Lecture 3 Supplement**

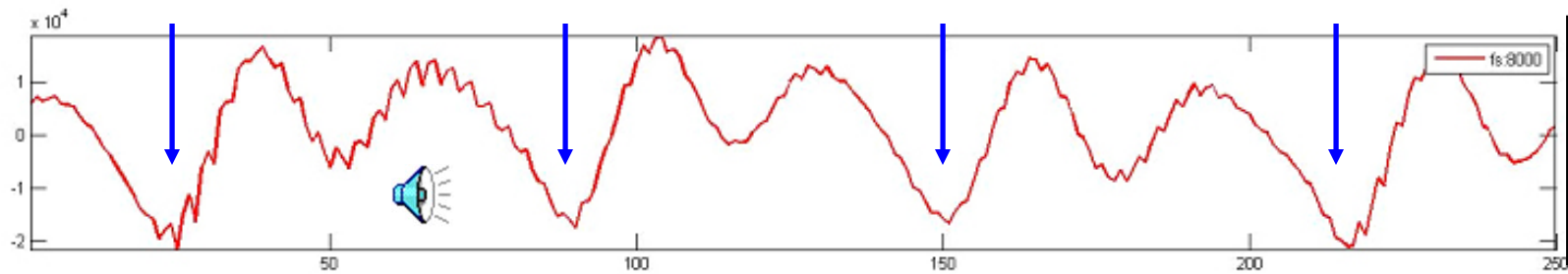
Pitch Detection from  
Waveform and Spectrogram



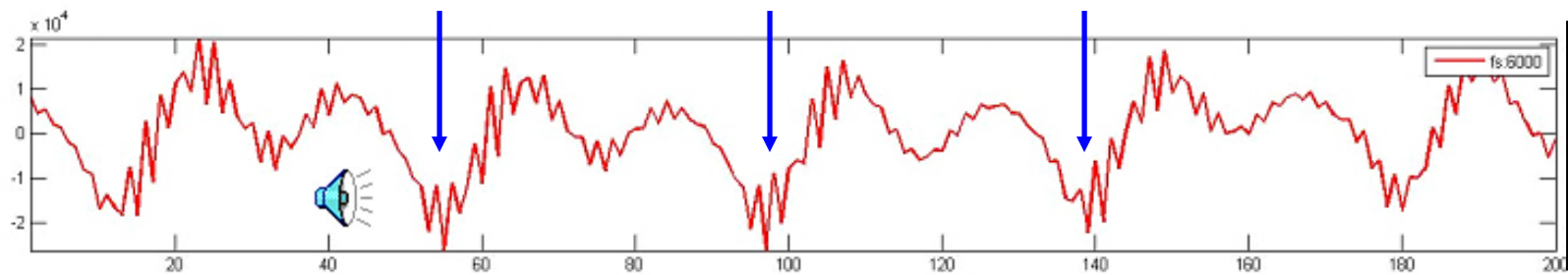
$\text{Period} = 360/3 = 120$  samples;  
 $\text{Pitch} = \text{fs}/\text{period} = 16000/120 = 133$  Hz



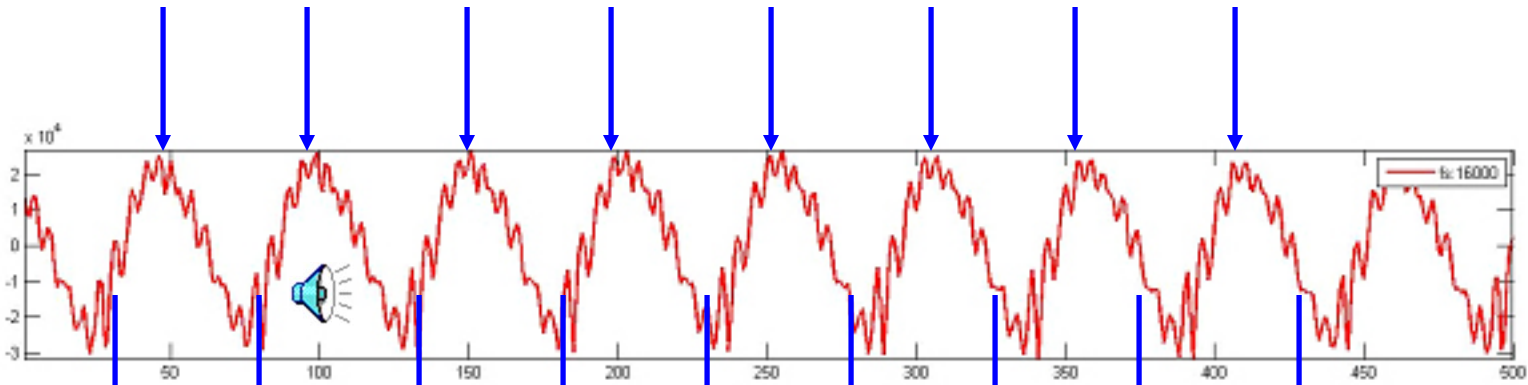
$\text{Period} = 225/3 = 75$  samples;  
 $\text{Pitch} = \text{fs}/\text{period} = 10000/75 = 133$  Hz



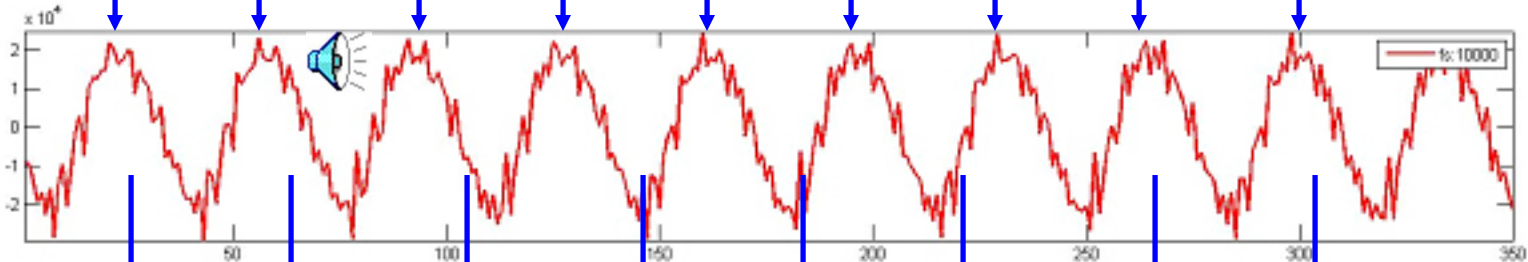
$\text{Period} = 195/3 = 65$  samples;  
 $\text{Pitch} = \text{fs}/\text{period} = 8000/65 = 129$  Hz



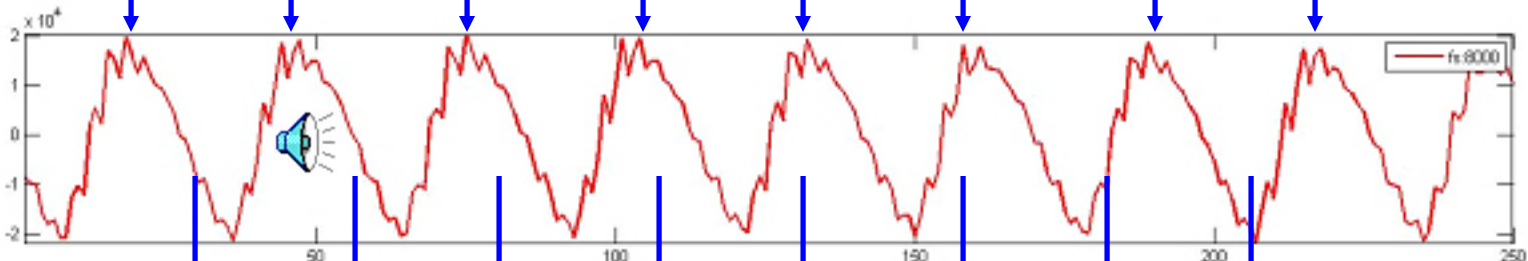
$\text{Period} = 82/2 = 41$  samples;  
 $\text{Pitch} = \text{fs}/\text{period} = 6000/41 = 146$  Hz



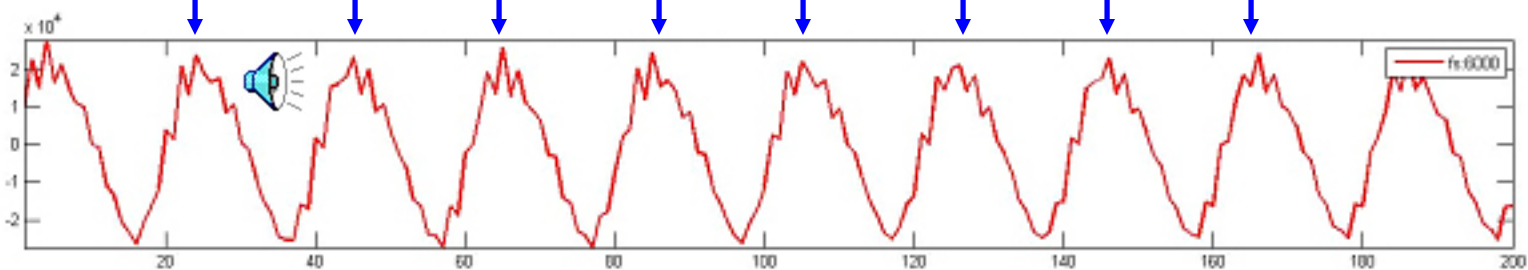
Period =  $365/7 = 52$  samples;  
 Pitch =  $f_s/\text{period} = 16000/52 = 308$  Hz



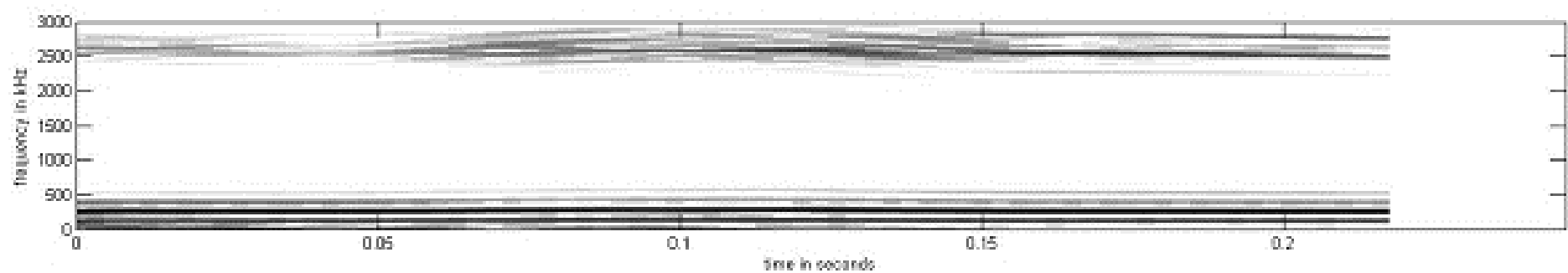
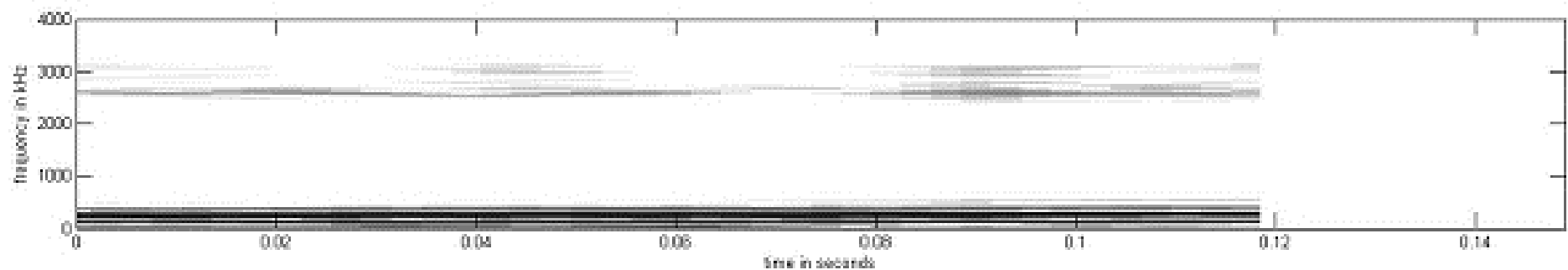
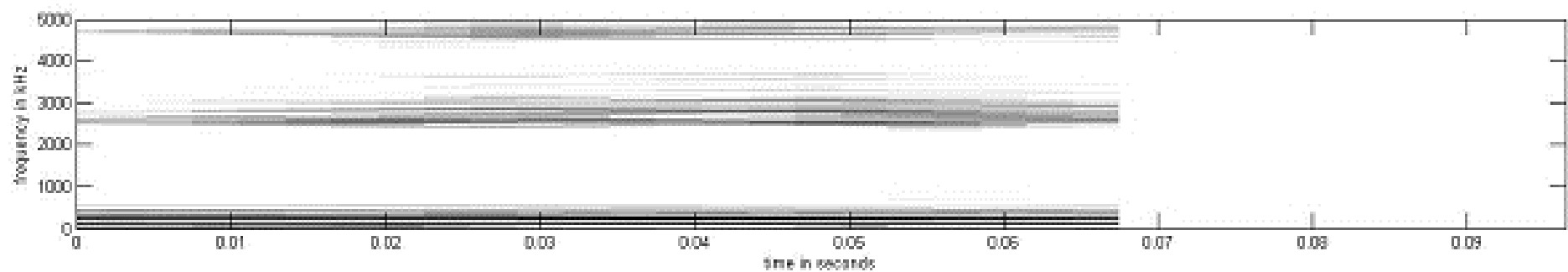
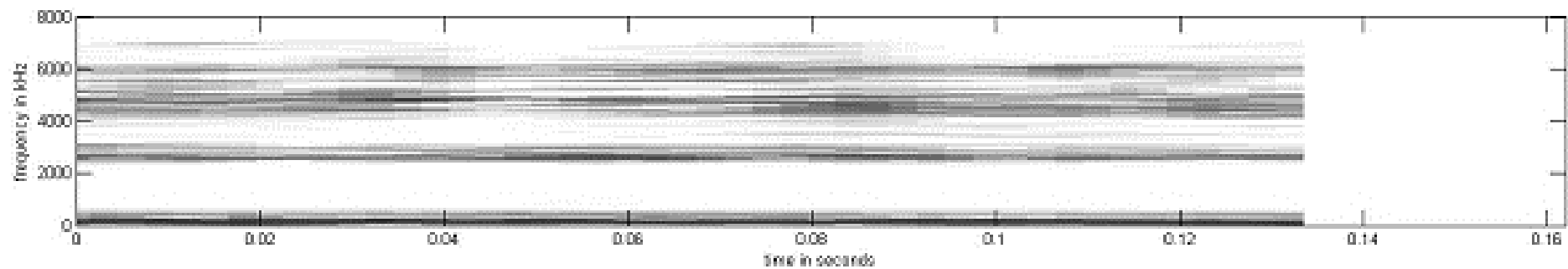
Period =  $275/8 = 34.4$  samples;  
 Pitch =  $f_s/\text{period} = 10000/34.4 = 291$  Hz

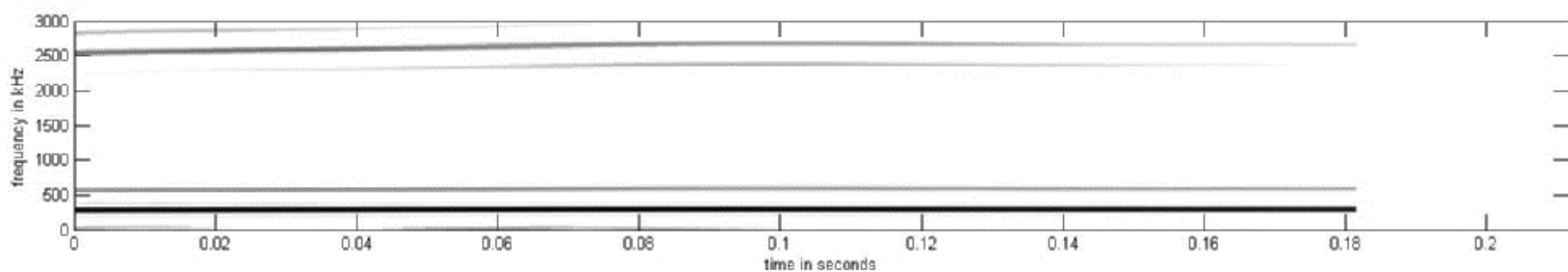
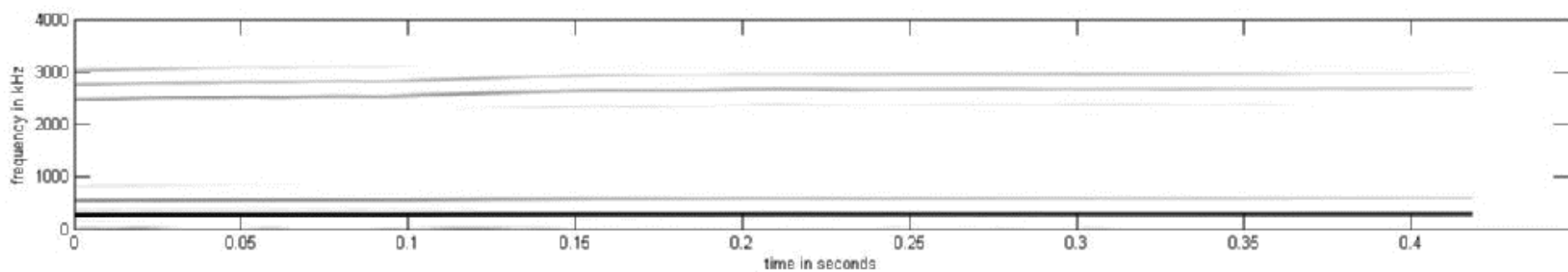
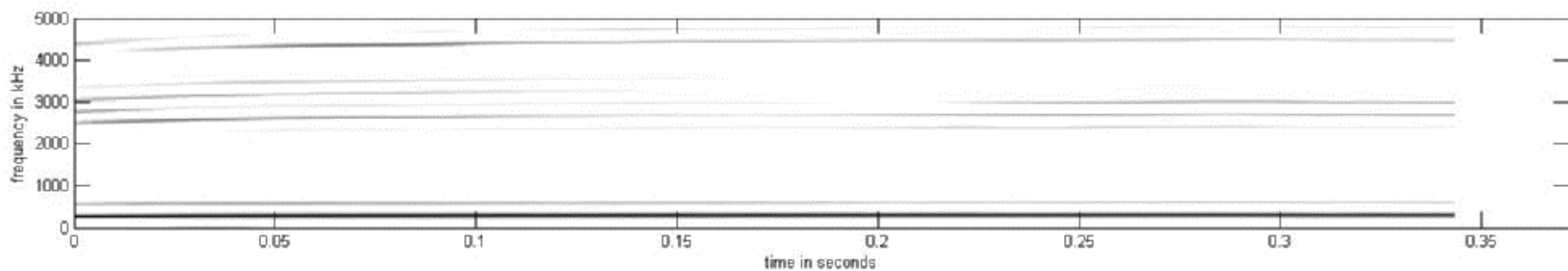
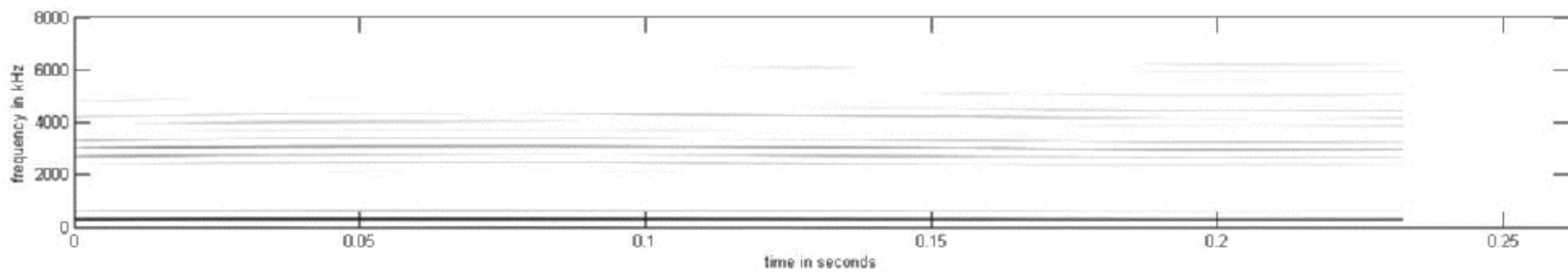


Period =  $205/7 = 29.3$  samples;  
 Pitch =  $f_s/\text{period} = 8000/29.3 = 273$  Hz

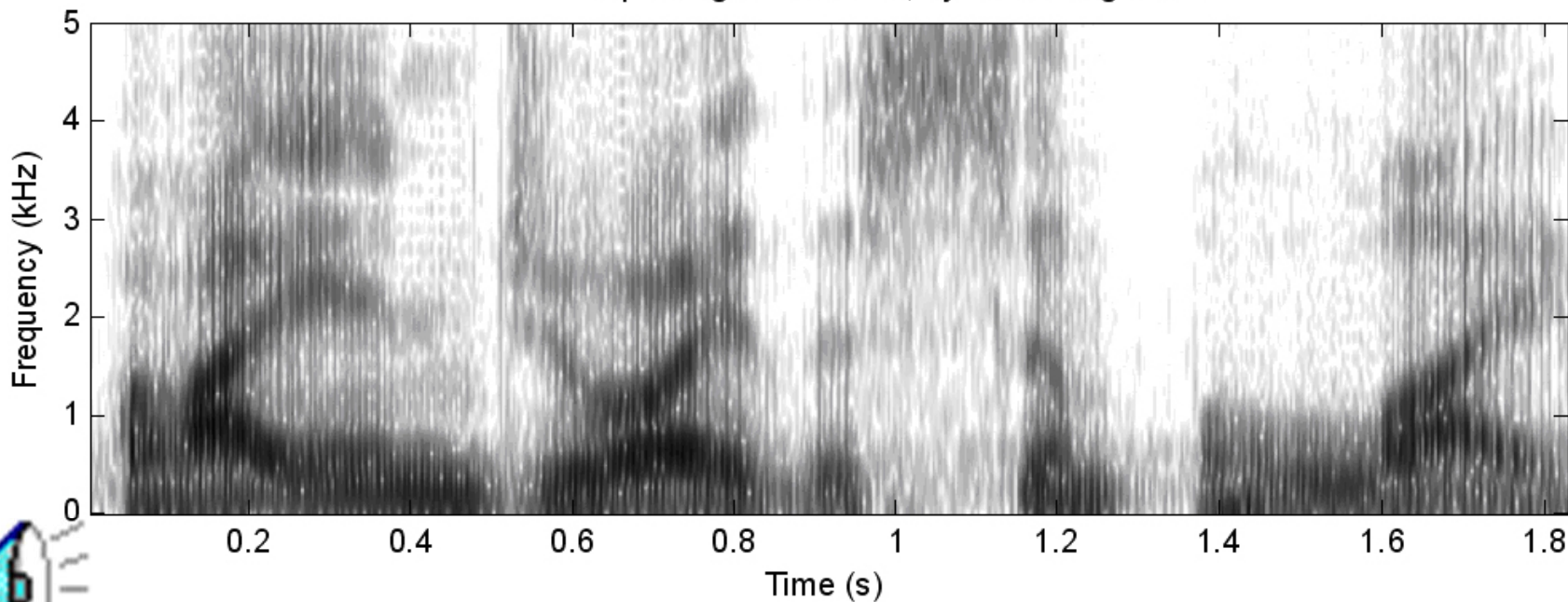


Period =  $141/7 = 20.1$  samples;  
 Pitch =  $f_s/\text{period} = 6000/20.1 = 298$  Hz





spectrogram bw: 400, dynamic range: 100



AY EH N JH OY DH-AX S IH-M P AX L AY F

