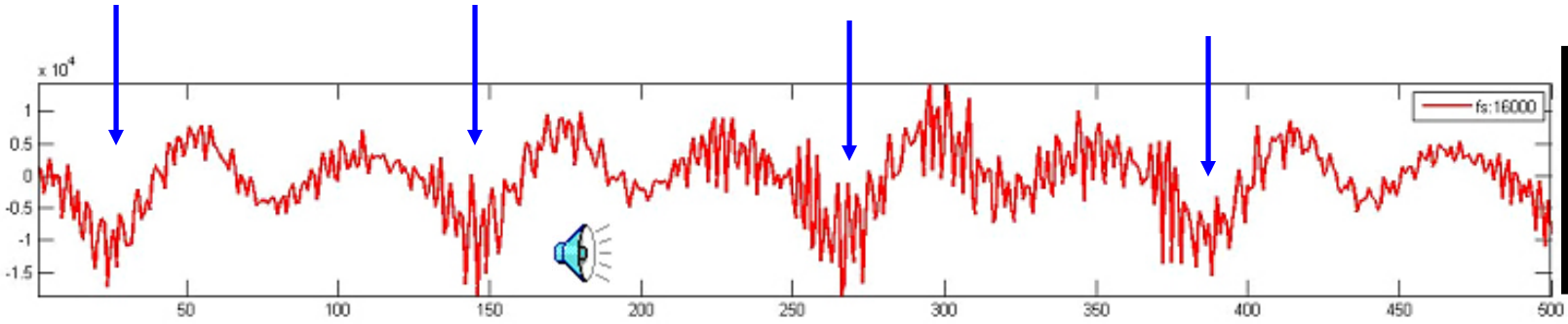
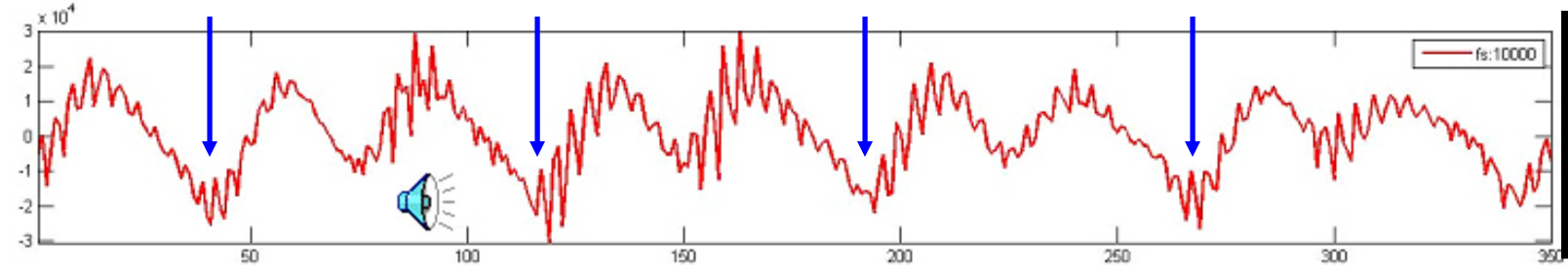
Lecture 3 Supplement

Pitch Detection from
Waveform and Spectrogram



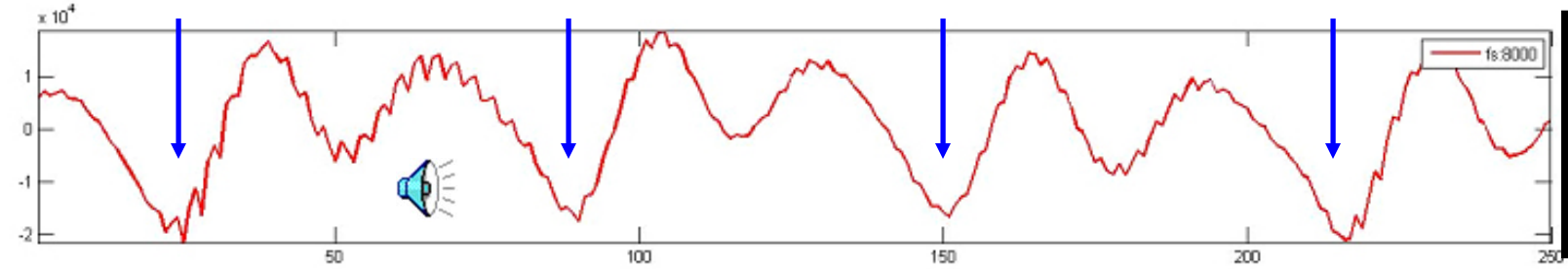
Period=360/3 = 120 samples;

Pitch=fs/period =16000/120 = 133 Hz



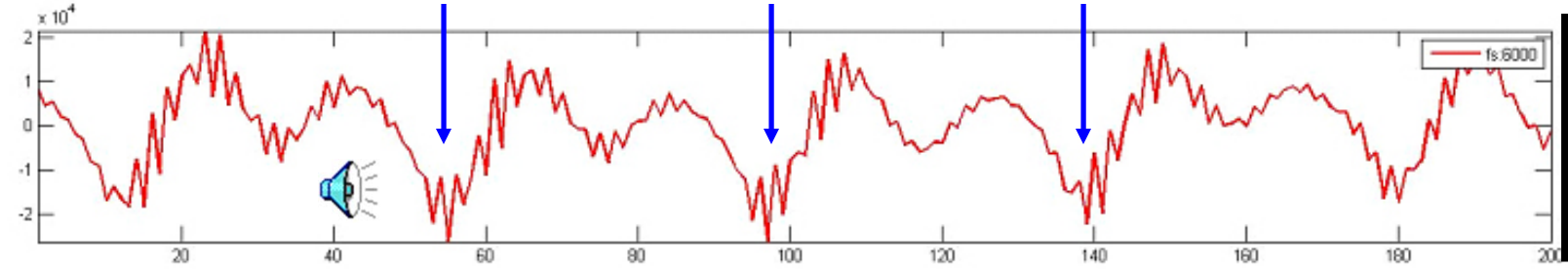
Period=225/3 = 75 samples;

Pitch=fs/period =10000/75 = 133 Hz



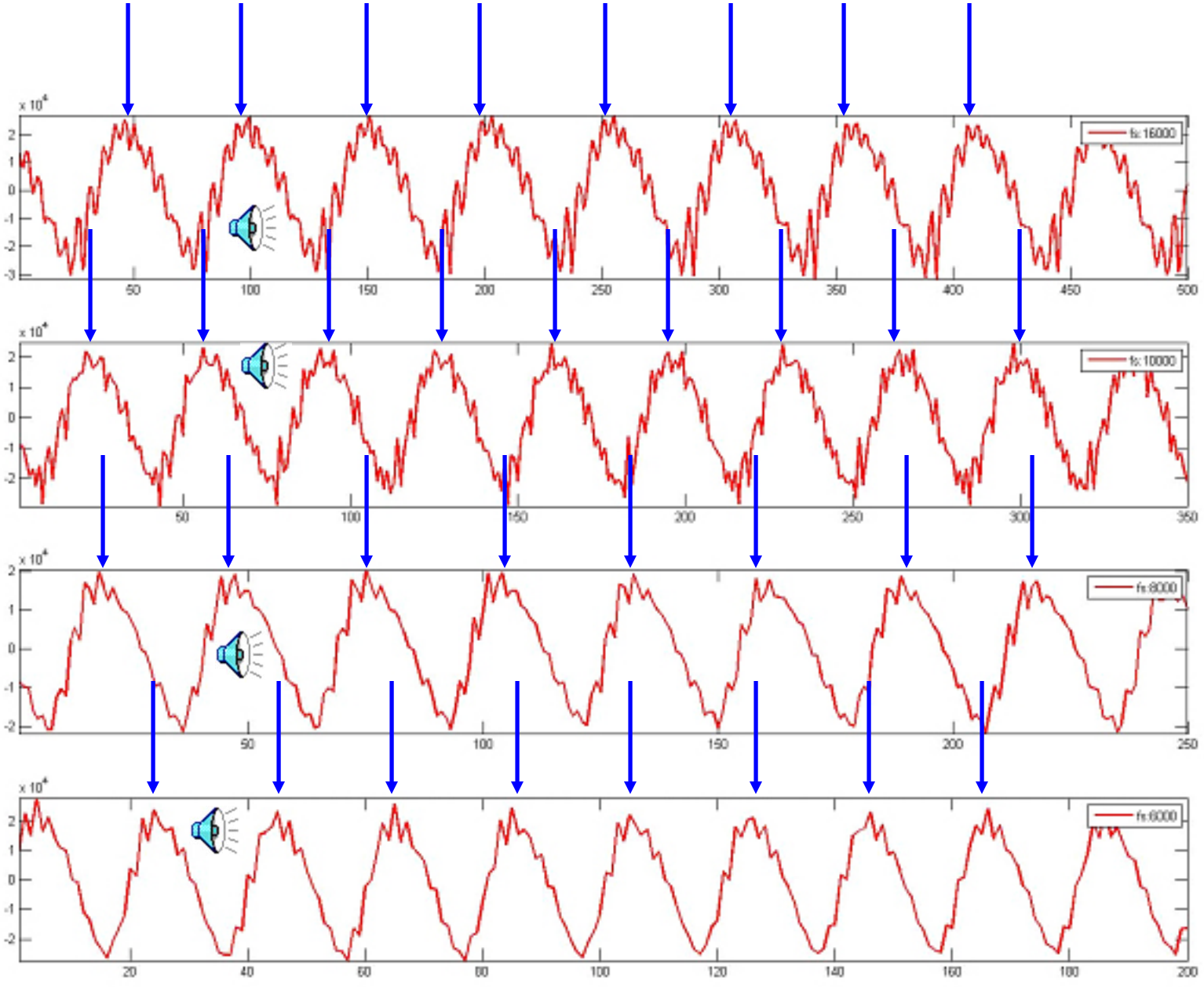
Period=195/3 = 65 samples;

Pitch=fs/period = 8000/65 = 129 Hz



Period=82/2 = 41 samples;

Pitch=fs/period = 6000/41 = 146 Hz



Period=365/7 = 52 samples;

Pitch=fs/period =16000/52 = 308 Hz

Period=275/8 = 34.4 samples;

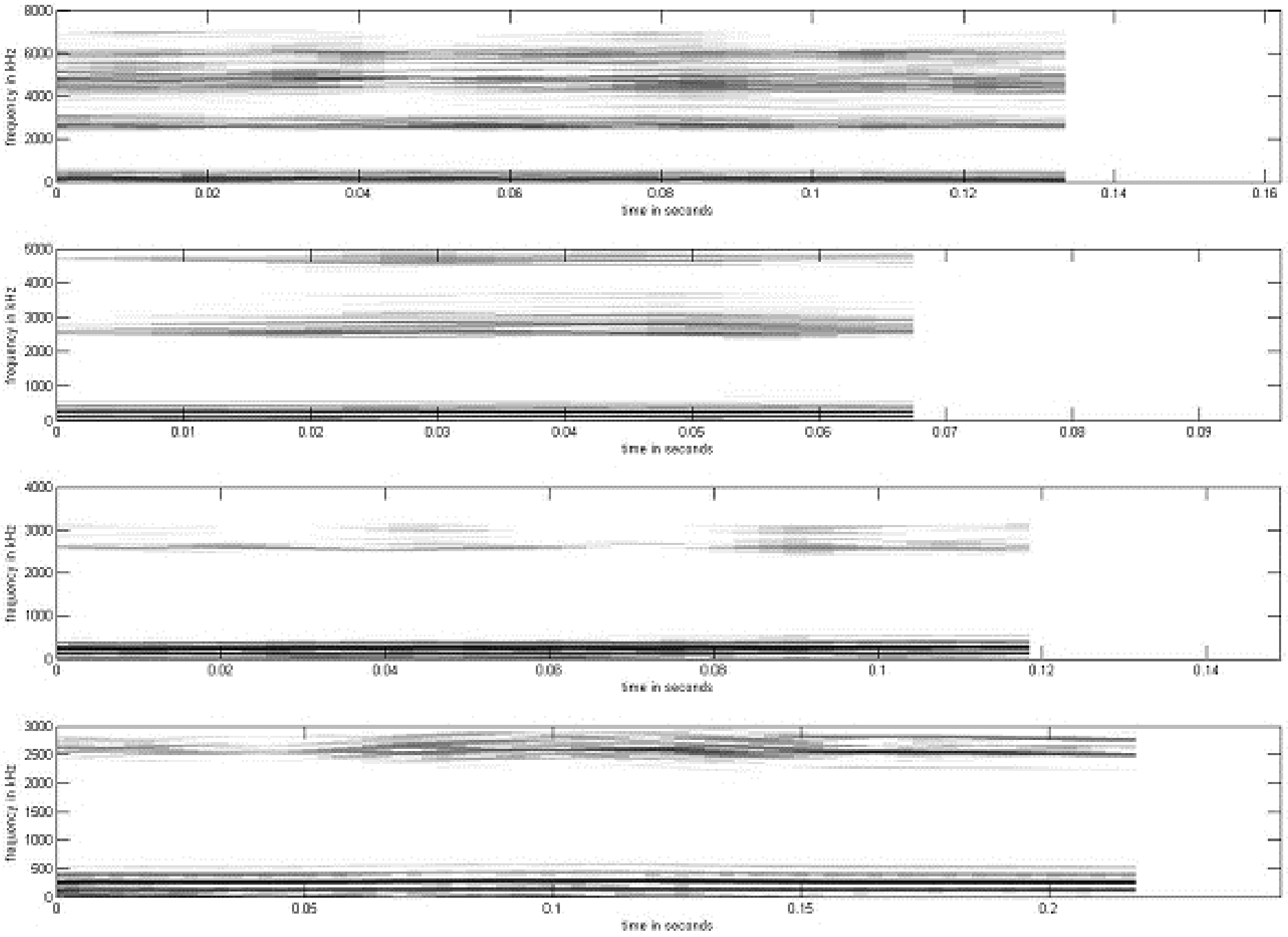
Pitch=fs/period =10000/34.4 = 291 Hz

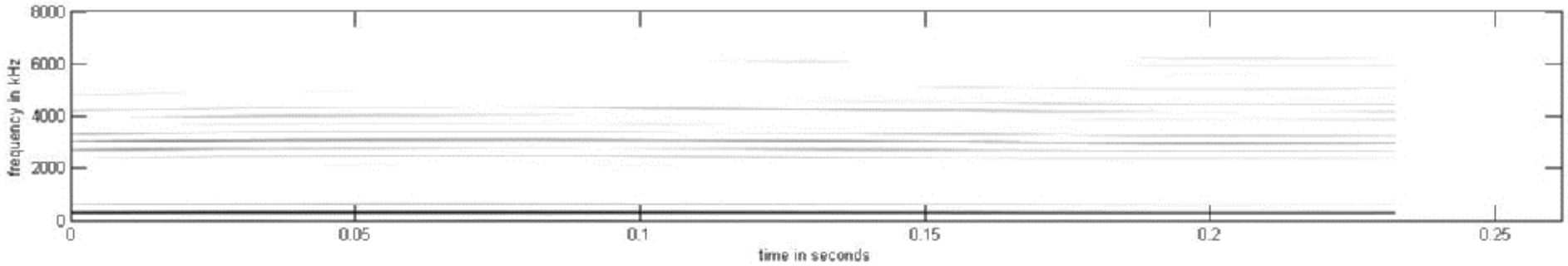
Period=205/7 = 29.3 samples;

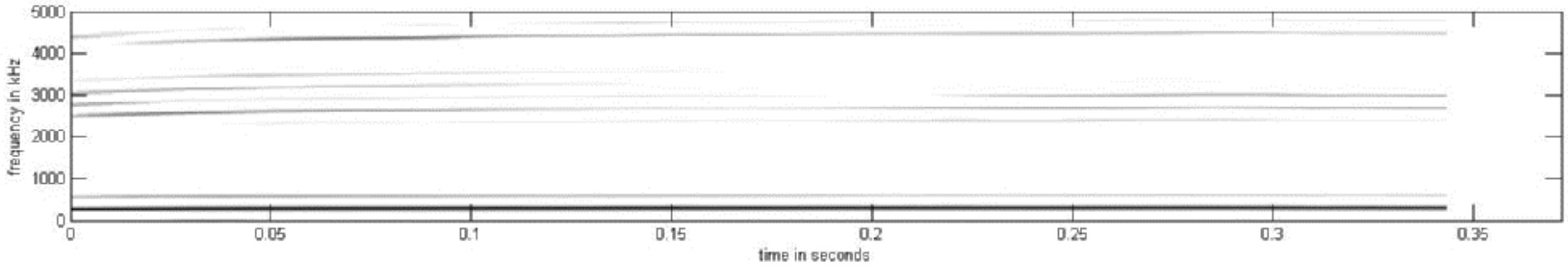
Pitch=fs/period =8000/29.3 = 273 Hz

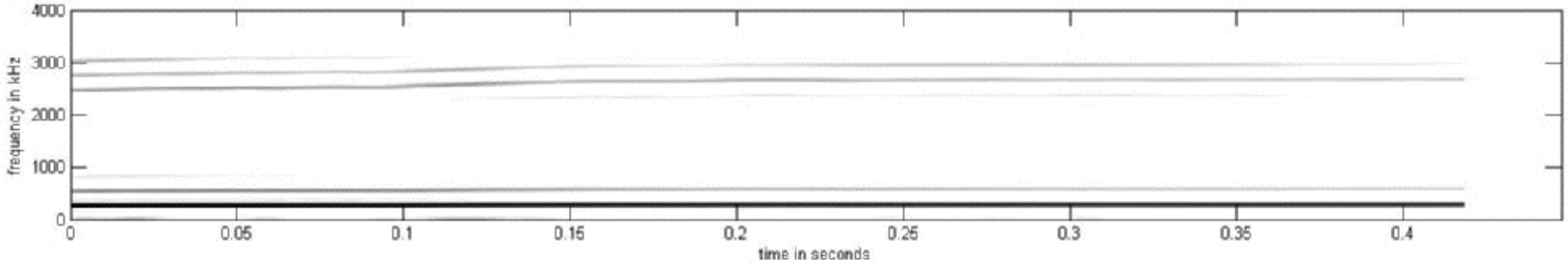
Period=141/7 = 20.1 samples;

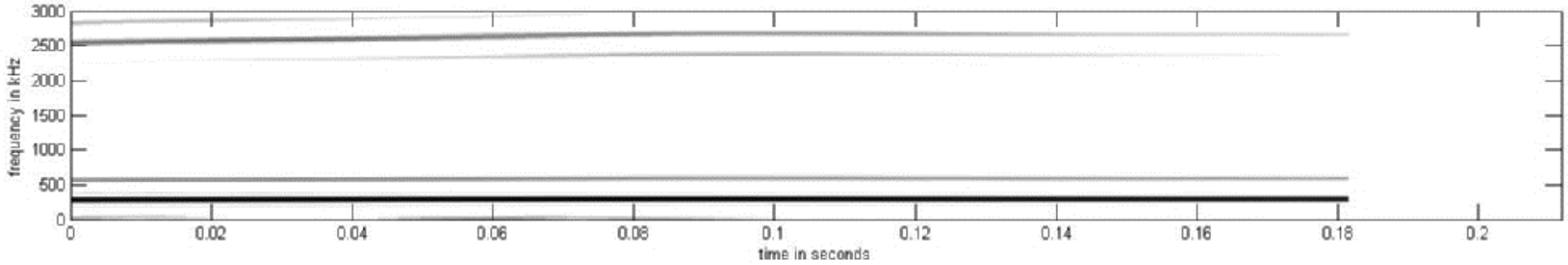
Pitch=fs/period =6000/20.1 = 298 Hz

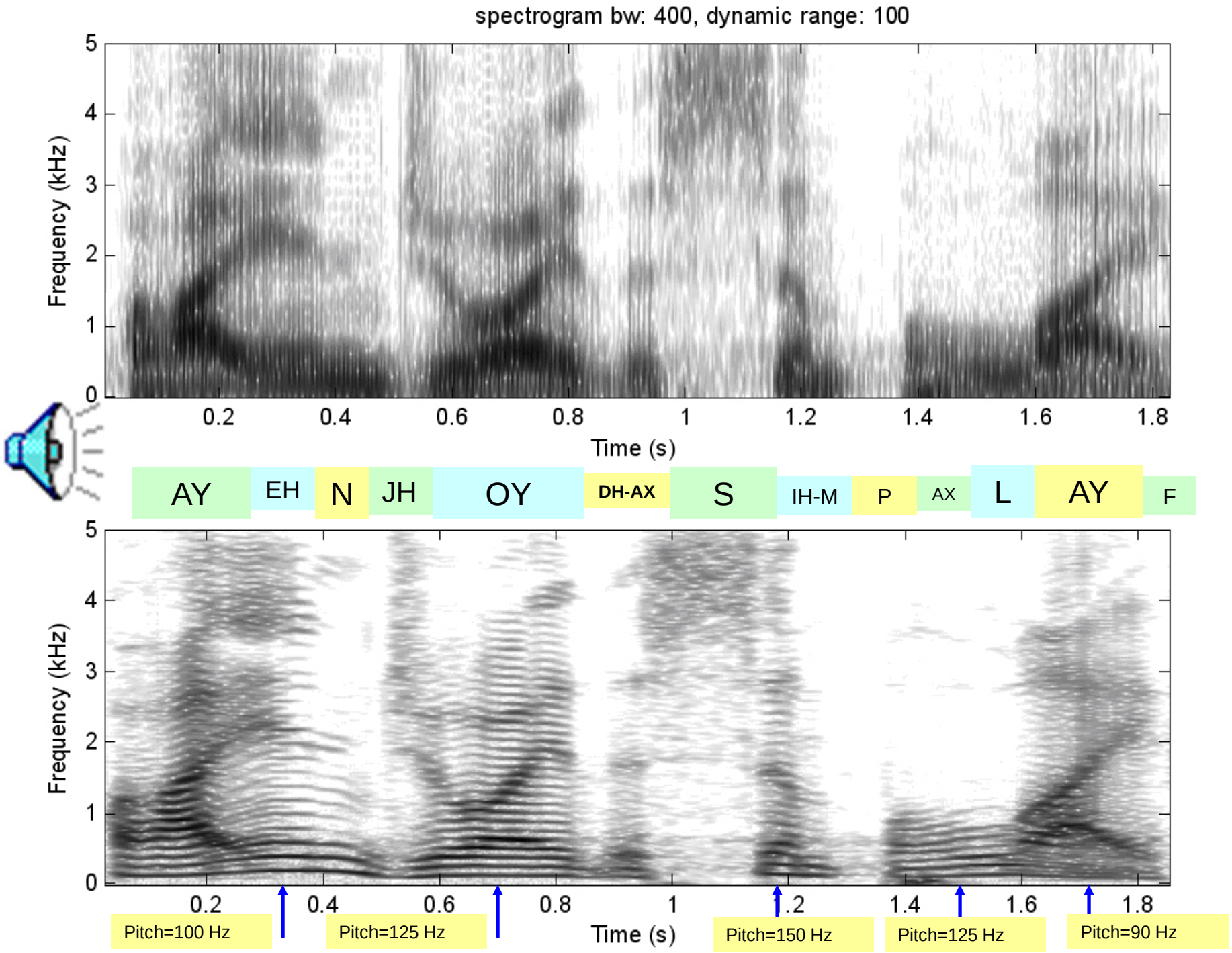

frequency in kHz
8000
6000
4000
2000
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
time in seconds
frequency in kHz
5000
4000
3000
2000
1000
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
time in seconds
frequency in kHz
4000
3000
2000
1000
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
time in seconds
frequency in kHz
3000
2500
2000
1500
1000
500
0
0
0.05
0.1
0.15
0.2
time in seconds


frequency in kHz
8000
6000
4000
2000
0
0
0.05
0.1
0.15
0.2
0.25
time in seconds


frequency in kHz
5000
4000
3000
2000
1000
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
time in seconds


frequency in kHz
4000
3000
2000
1000
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
time in seconds


frequency in kHz
3000
2500
2000
1500
1000
500
0
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0.2
time in seconds


spectrogram bw: 400, dynamic range: 100
Frequency (kHz)
Time (s)
AY
EH
N
JH
OY
DH-AX
S
IH-M
P
AX
L
AY
F
Pitch=100 Hz
Pitch=125 Hz
Pitch=150 Hz
Pitch=125 Hz
Pitch=90 Hz