

University of California
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Department of Electrical Engineering
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EE225D

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Pitch Perception

Lecture 17

Some Definitions of “Pitch” (Webster).

Any of various...viscous substances obtained as residues in the distillation of tars or other organic substances.

To erect, e.g. a tent

To throw, fling

To deliver a baseball to a batter

To toss coins

To sell, peddle or advertise in a high-pressure way

* *A particular highness or lowness of tone*

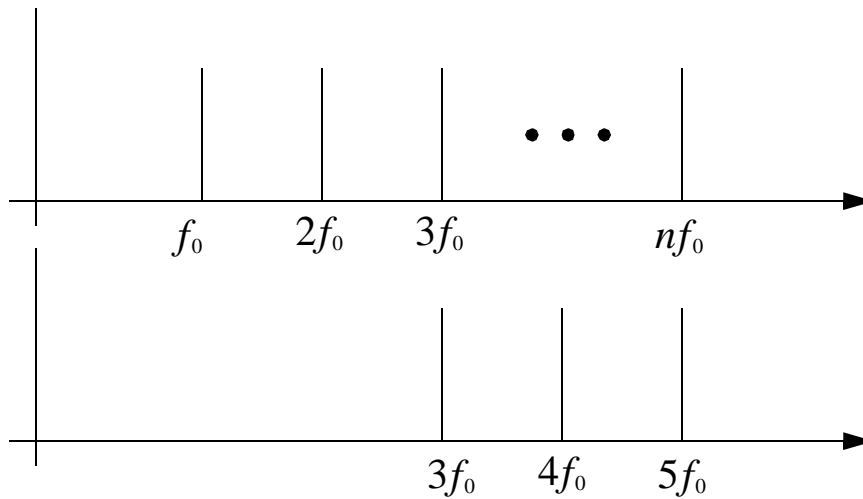
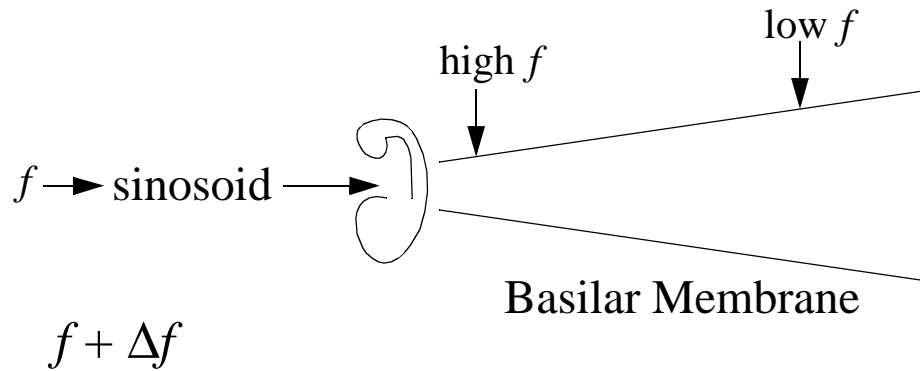
* *A particular musical note*

To utter...with a glibness typically marked by exaggeration

To chip (a stone) so as to have straight lines and a flat surface

To fall headlong (pitch forward)

Model the auditory systems to explain pitch measurements.



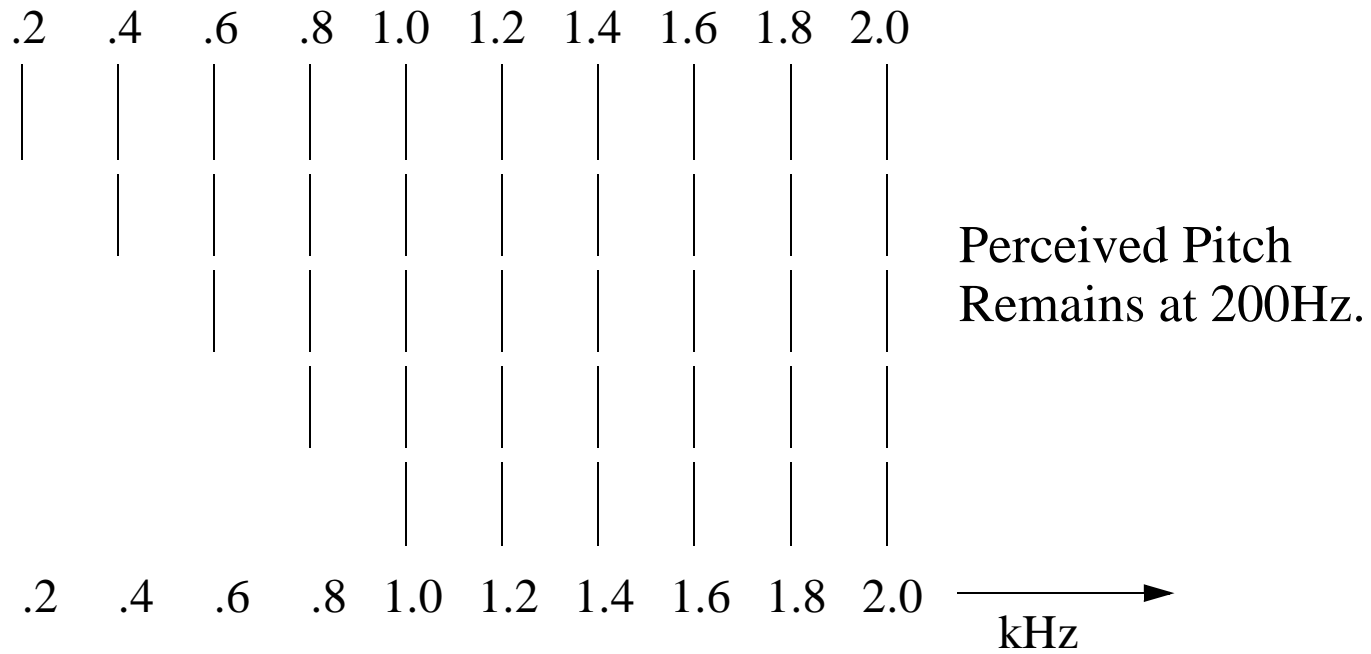
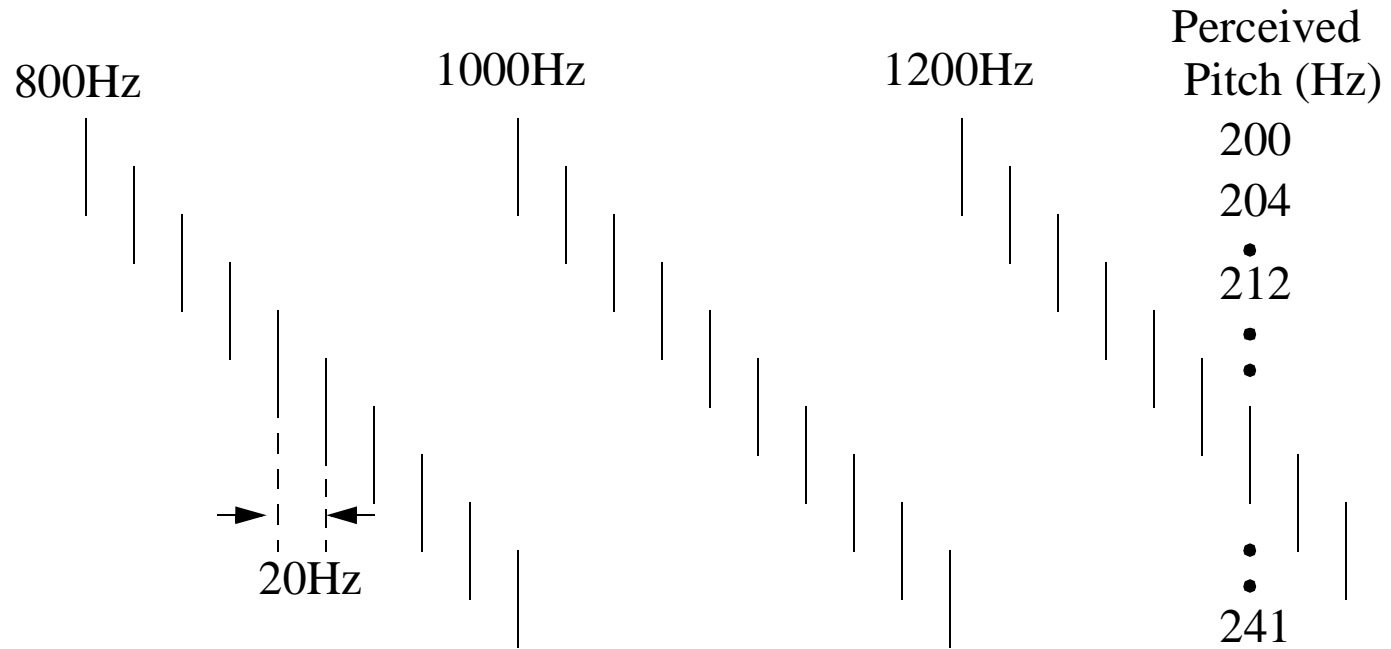


Figure 16.4 : Virtual Pitch Demonstration.



Shift of Virtual Pitch ...Demonstration 1

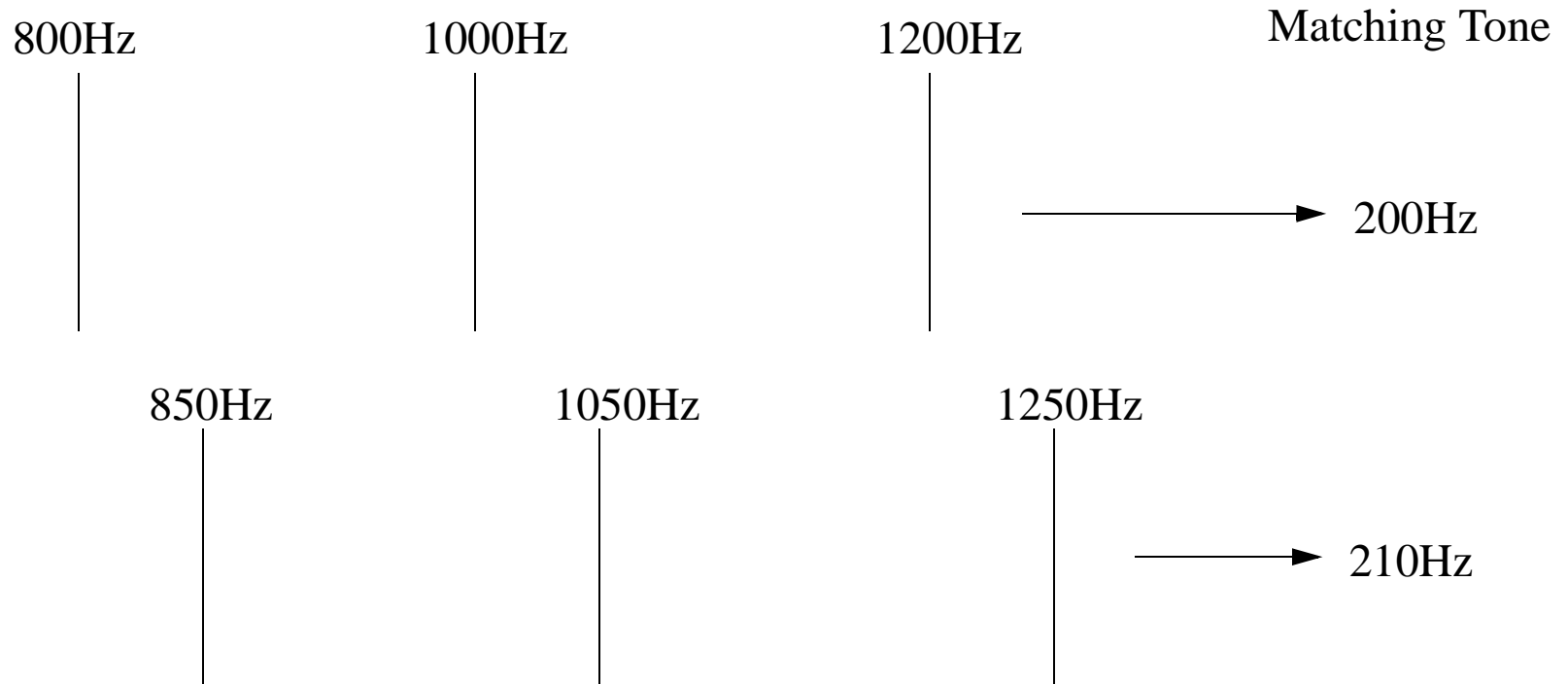
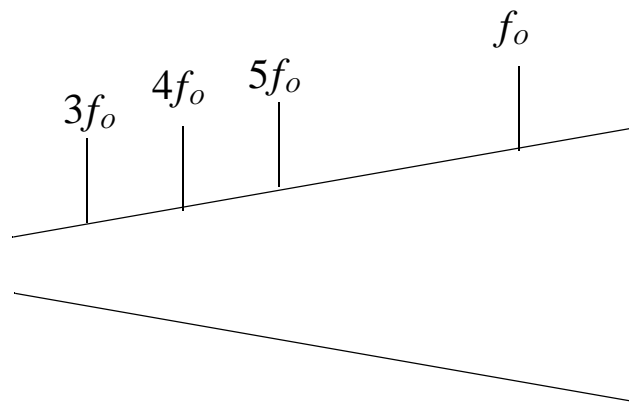


Figure 16.11 : Shift of Virtual Pitch...Demonstration 2.



Schouton \Rightarrow Periodicity

Helmholtz \Rightarrow Place

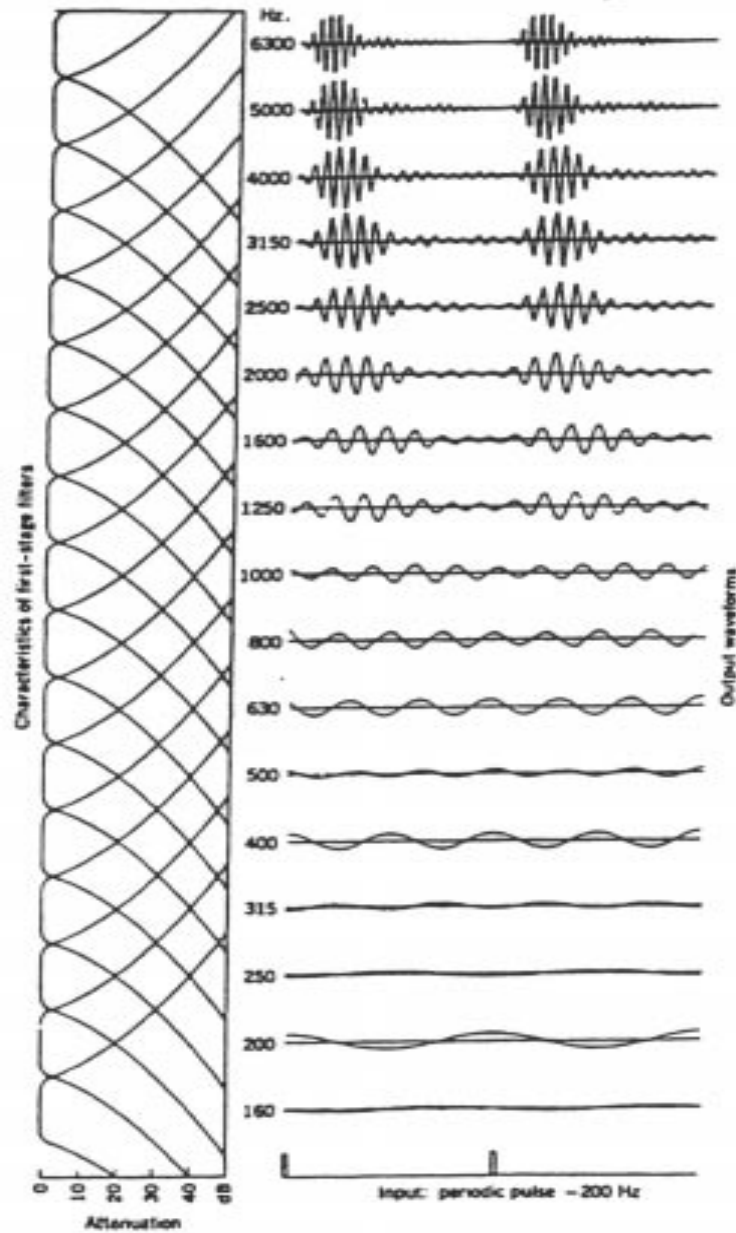


Figure 16.5 : Schouten's Depiction of
BM Responses to a Periodic 200Hz
Pulse Train.

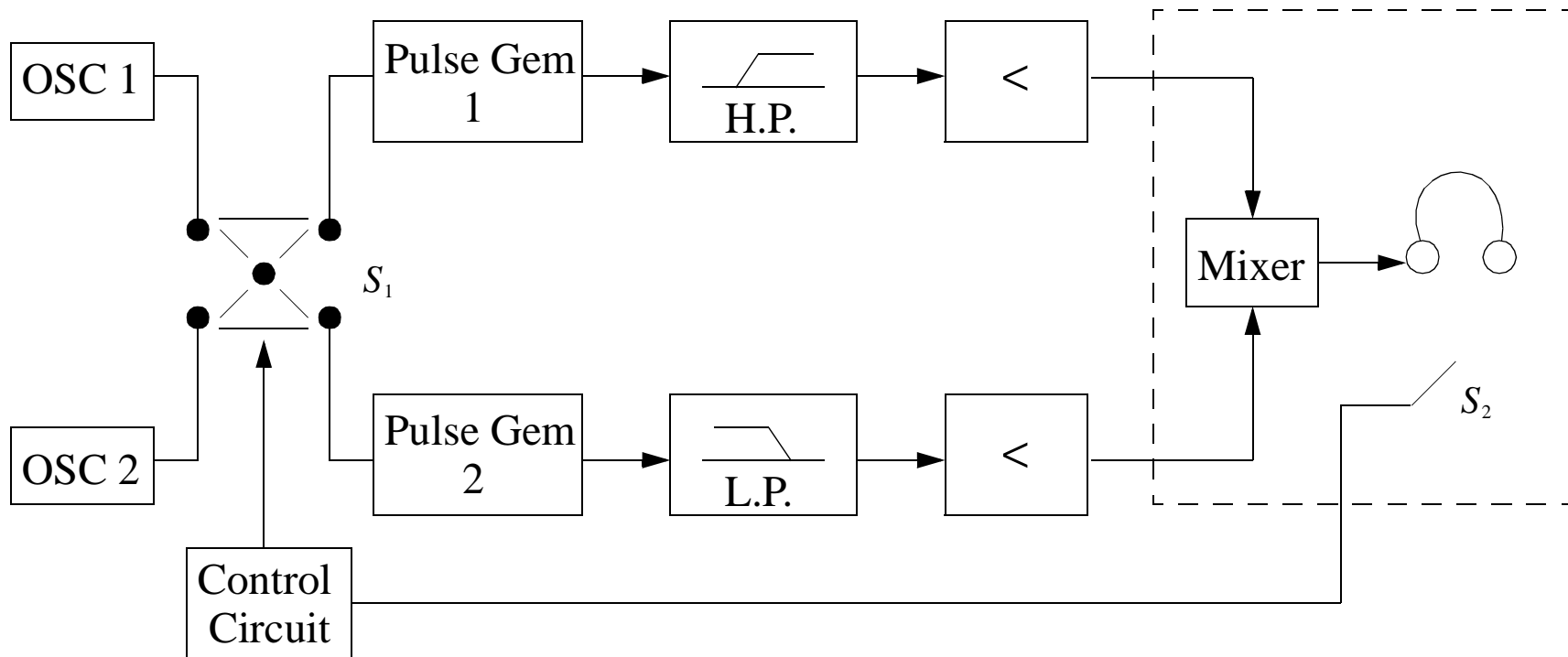
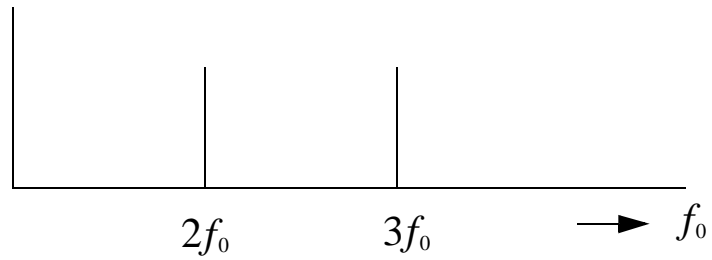
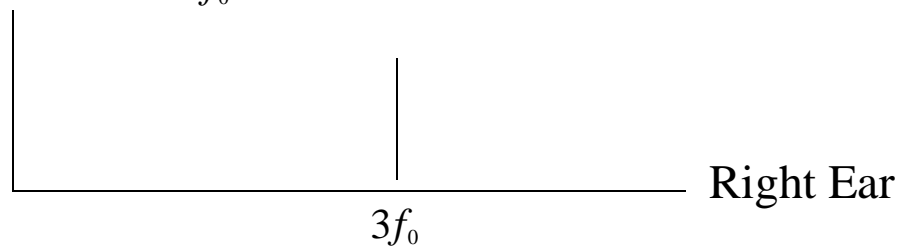


Figure 16.6 : Ritsma's Setup to Determine Dominant Frequencies for Pitch Perception.

Houtsma and Goldstein



- Play into both ears.



PHYSIOLOGICAL DATA FROM MILLER AND SACHS
 "Representation of Voice Pitch in Discharge
 Patterns of Auditory Nerve Fibers"

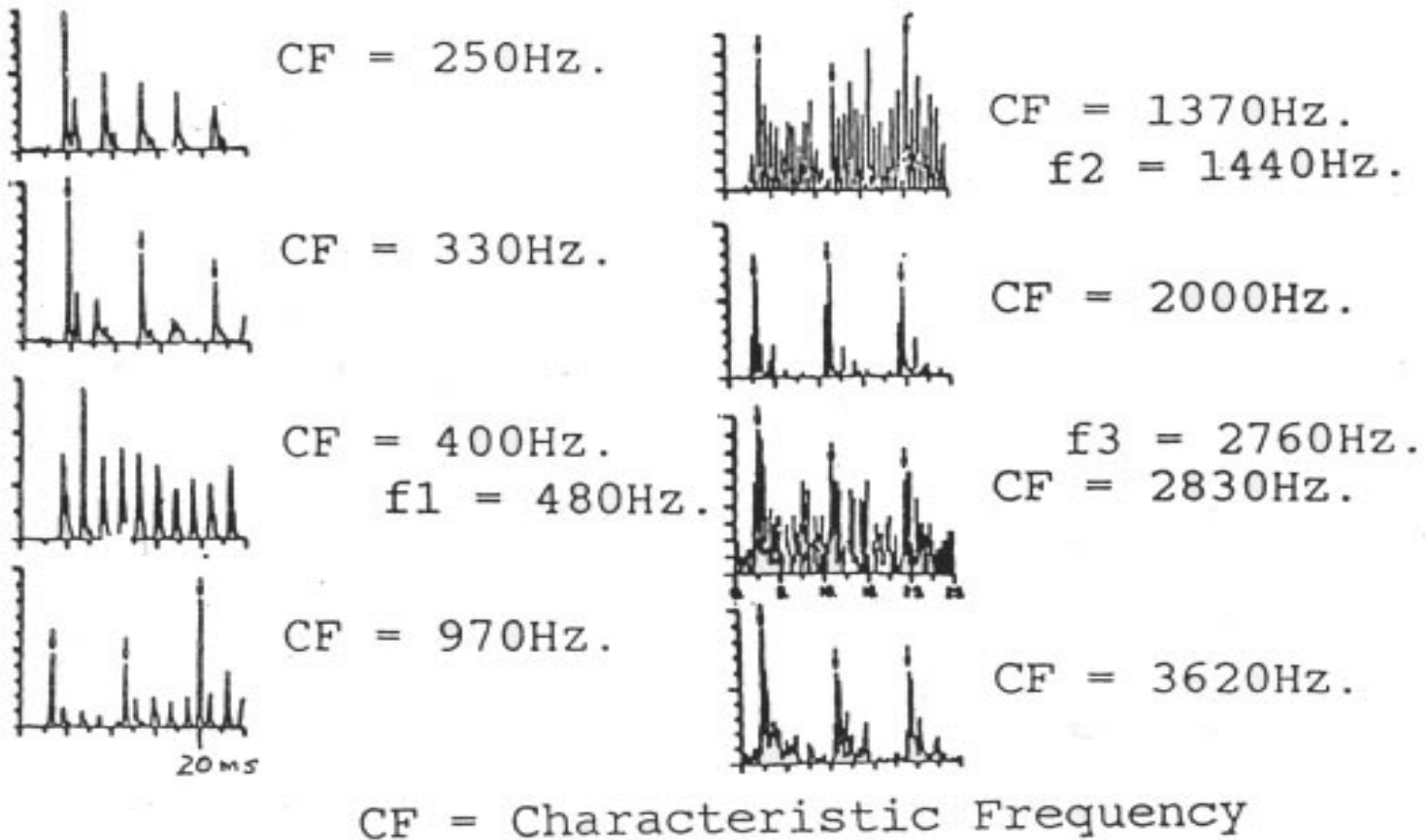


Figure 16.7 : Histograms of Spiking Intervals

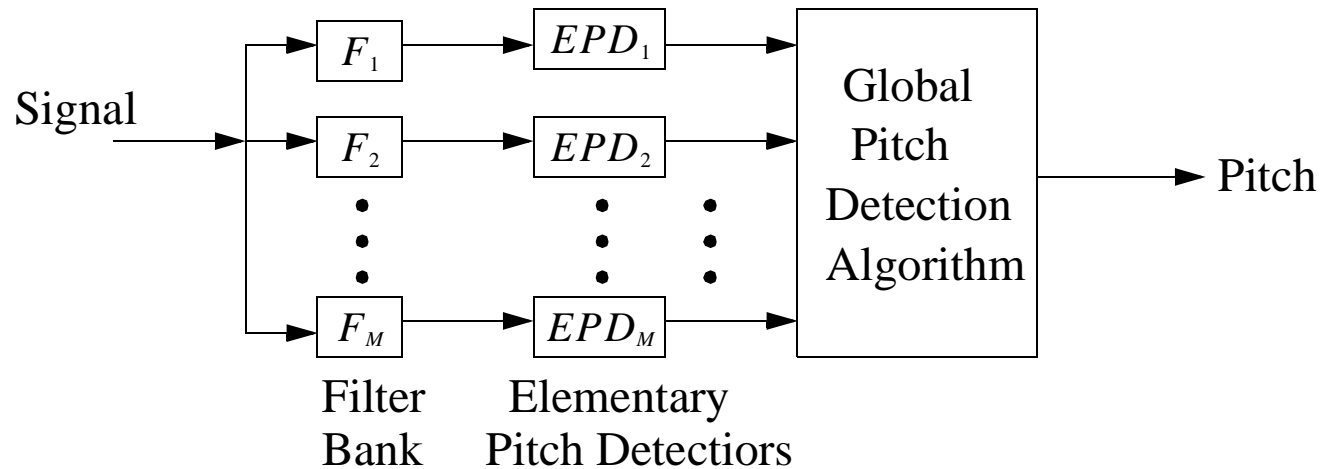


Figure 16.9 : Block Diagram of the Periodicity Model.

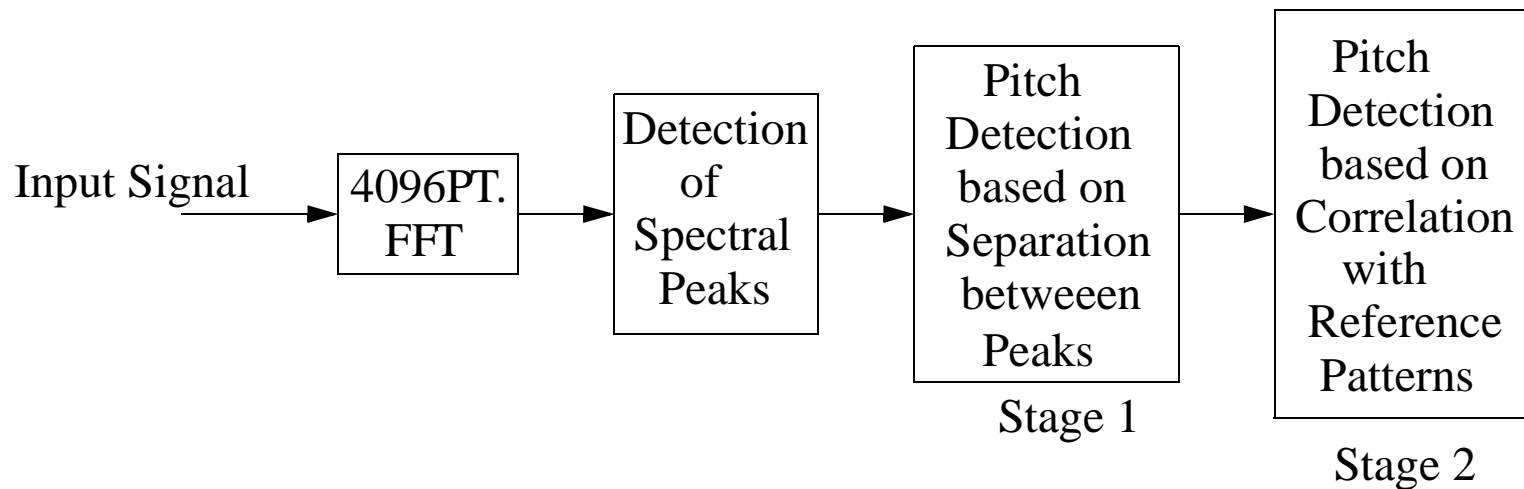


Figure 16.10 : Block Diagram of the Place Model.

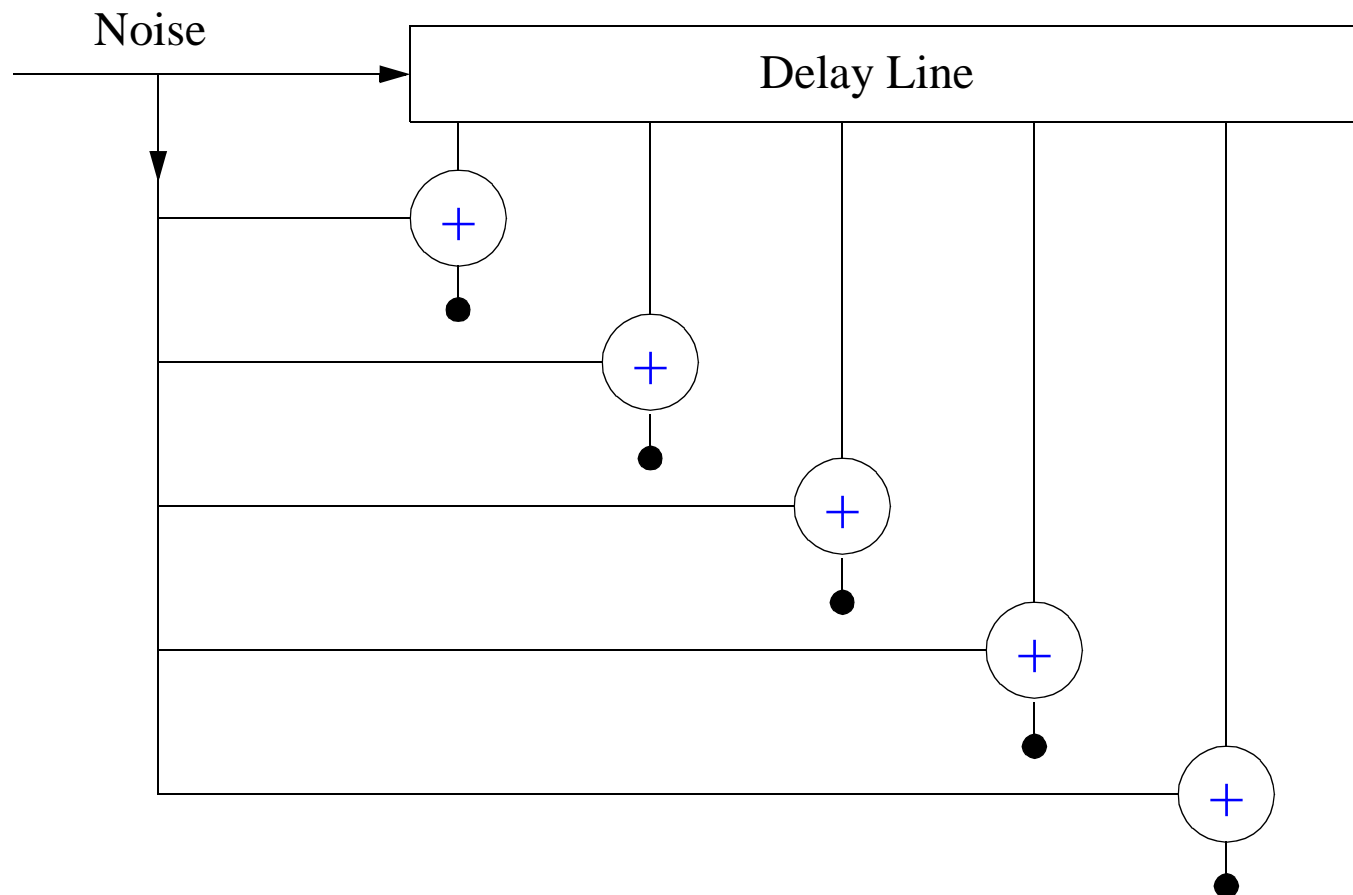


Figure 16.13 : Comb-Filtered Noise with Different Delays
(Perceived Pitch is Inverse to Delays)

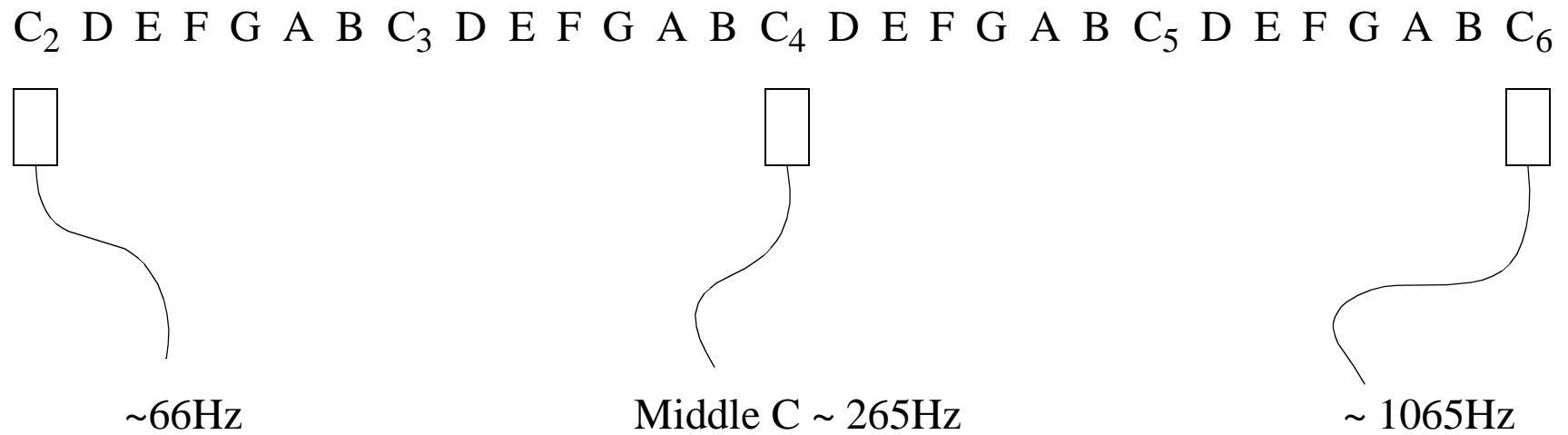


Figure 16.14 : Comb-Filtered Noise Demonstation.