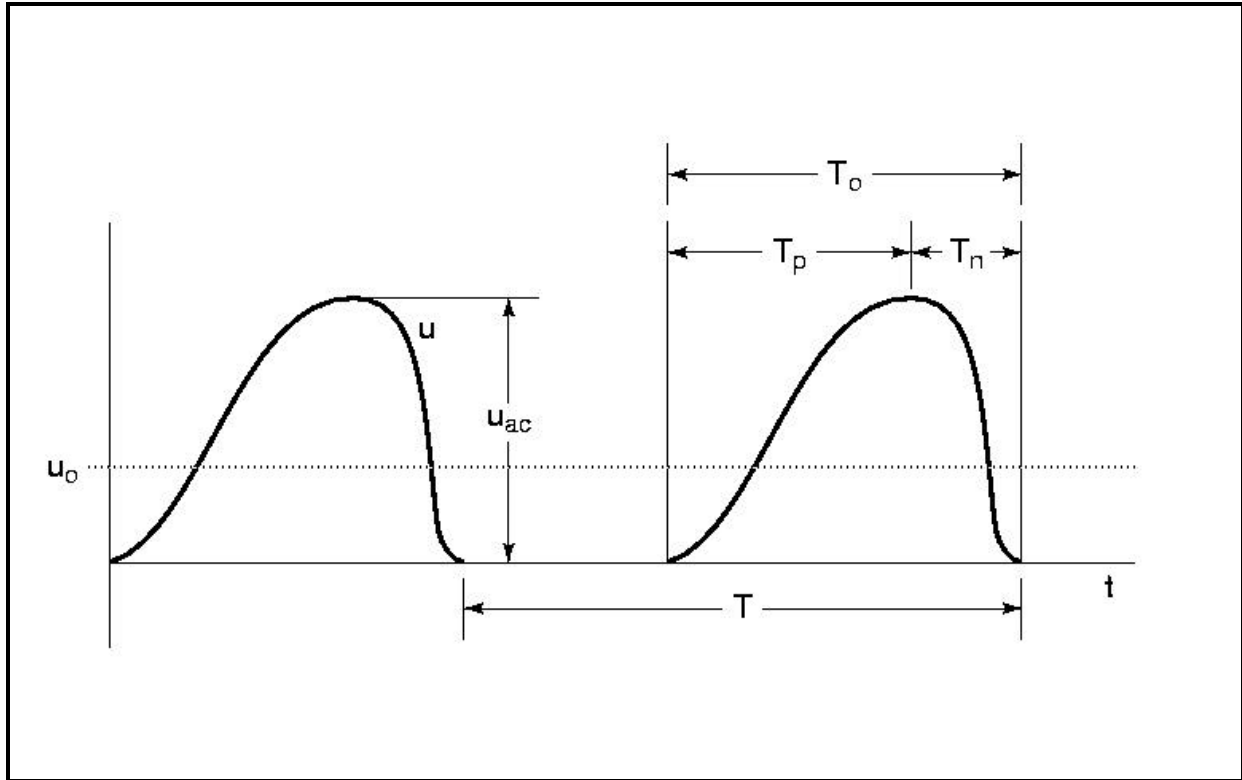

Working on Ways to Help Automate the Vocal Synthesis Model by Using Midi Input

Eric Hunter, MS
July 8, 1998

Glottal Flow Pulse Model

(1994, Titze, I. R., Mapes, S., and Story, B.)



$$F_o = \frac{1}{T}; \quad Q_o = \frac{T_o}{T}; \quad Q_s = \frac{T_p}{T_n}$$

F_o = fundamental frequency
 T = period of oscillation
 T_p = time of increasing flow
 T_o = duration of flow

u_o = average flow
 u_{ac} = time-varying flow
 Q_o = open quotient
 Q_s = skewing quotient

Current Method Model Input...

- **Glottal Parameter Files**

Script files contain all of the glottal Flow Pulse information accompanying timing information.

- **Vocal Tract (Area) Files**

Area Files contain vocal tract area information accompanying timing information.

Pros-

Easy to use in for research and exploration exercises.

Cons-

Extremely time consuming when synthesizing multiple word utterances or songs.

Real-Time Interactive Methods

- **Computer Keyboard Control**

Fundamental Frequency ascending and descending steps were linked to specific key presses on a computer keyboard. Synthesis model ran continuously.

Pros-

Defiantly a step in the right direction.

Glottal parameters could be linked to other key presses.

Cons-

Non-intuitive interface for control of all parameters...

Pitch

Amplitude

Skewing Quotient

Open Quotient

Vocal Tract Information

Real-Time Interactive Methods

- MIDI keyboard control (the dream)



F_o linked to the upper half of the keyboard
Vocal Tract or Vowel information linked to lower half.

Q_o encoded in “Key Pressure” on the F_o end while possibly vowel variation or Q_s variation is encoded on the lower half of the keyboard.

Average Flow controlled by foot pedal.

Pros-

Highly intuitive interface for anyone with musical keyboard experience (IE Key Pressure = Pressed sound).

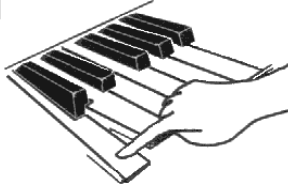
Cons-

Implementation.

“Adding a different input device (IE MIDI) will be more involved.”

Non Real-Time (but faster) Interactive Methods

- MIDI keyboard control (near future)



Use MIDI keyboard to obtain pitch information as the keyboard player speaks mono-tonically into a microphone for later analysis and re-combination of data..

MIDI information obtained from “The MIDIfarm”
www.midifarm.com