Vowels

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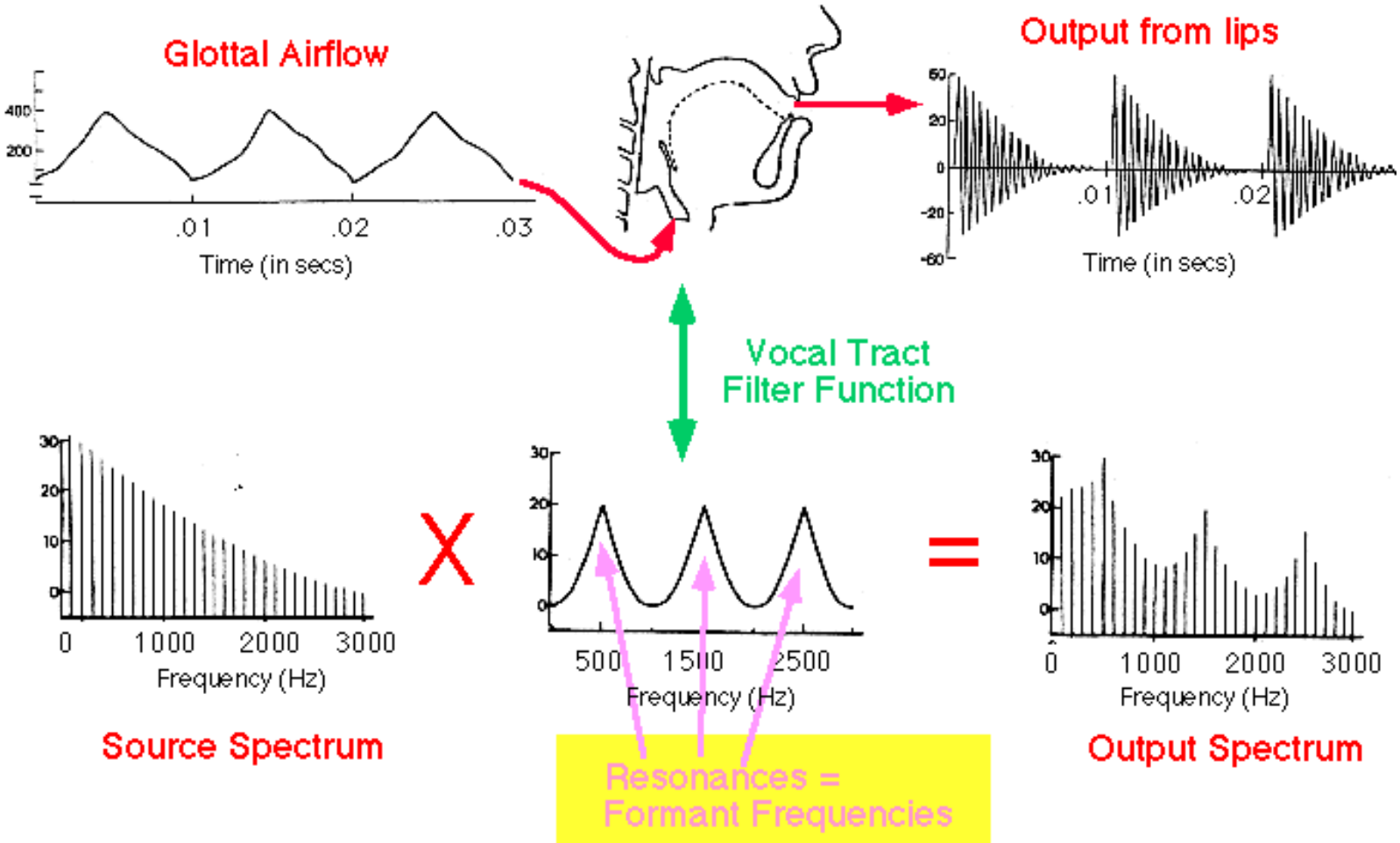
презентация доступна:

Previously

- Sound waves have
  - A — amplitude
  - f — fundamental frequency
  - φ — phase
  - t — time
- Speech sounds are complex waves
- Fourier transform — allows to extract components of the complex wave

Source-Filter Model

- Larynx produce some sound
- Vocal tract filter some frequencies

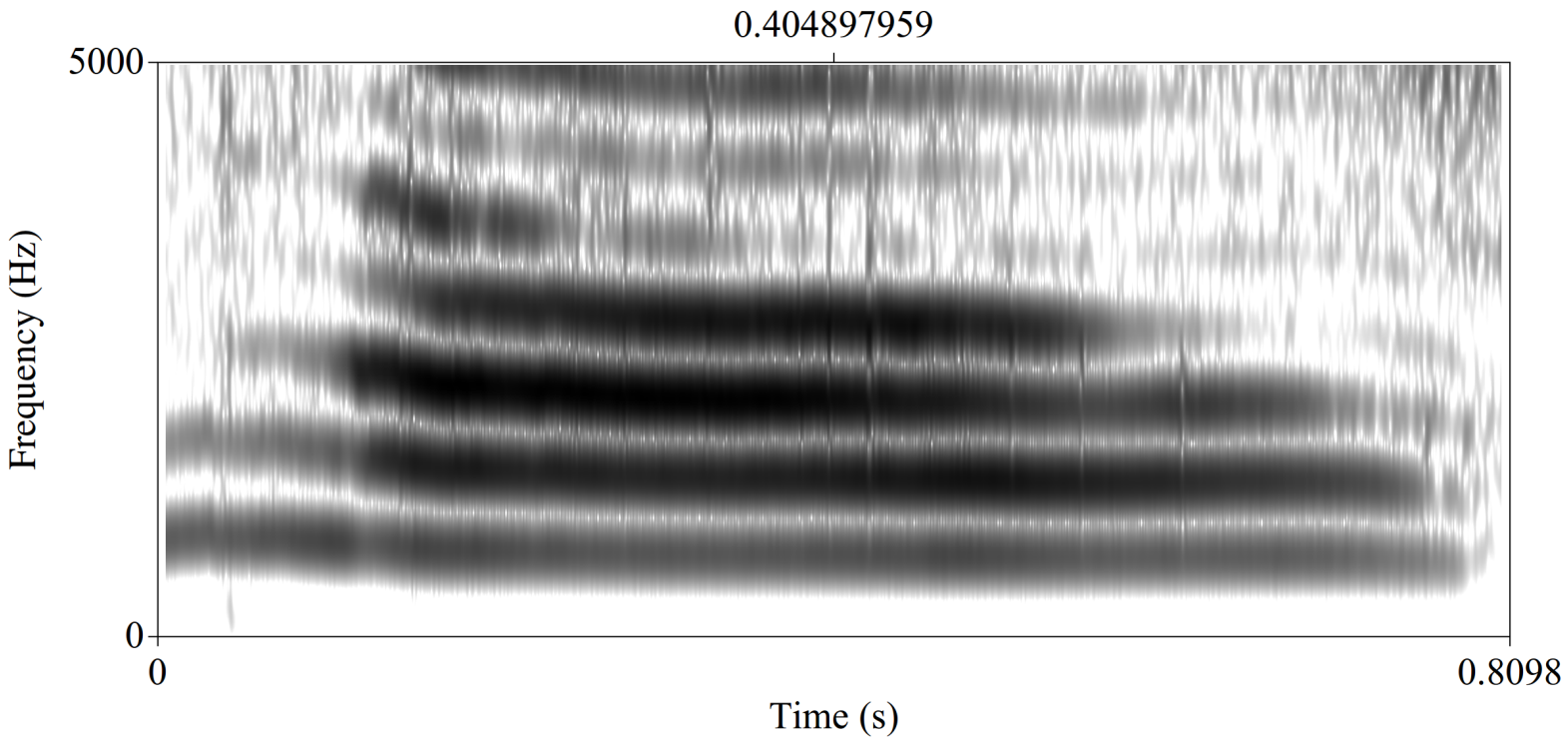


презентация доступна:

Source-Filter Model of Speech Production

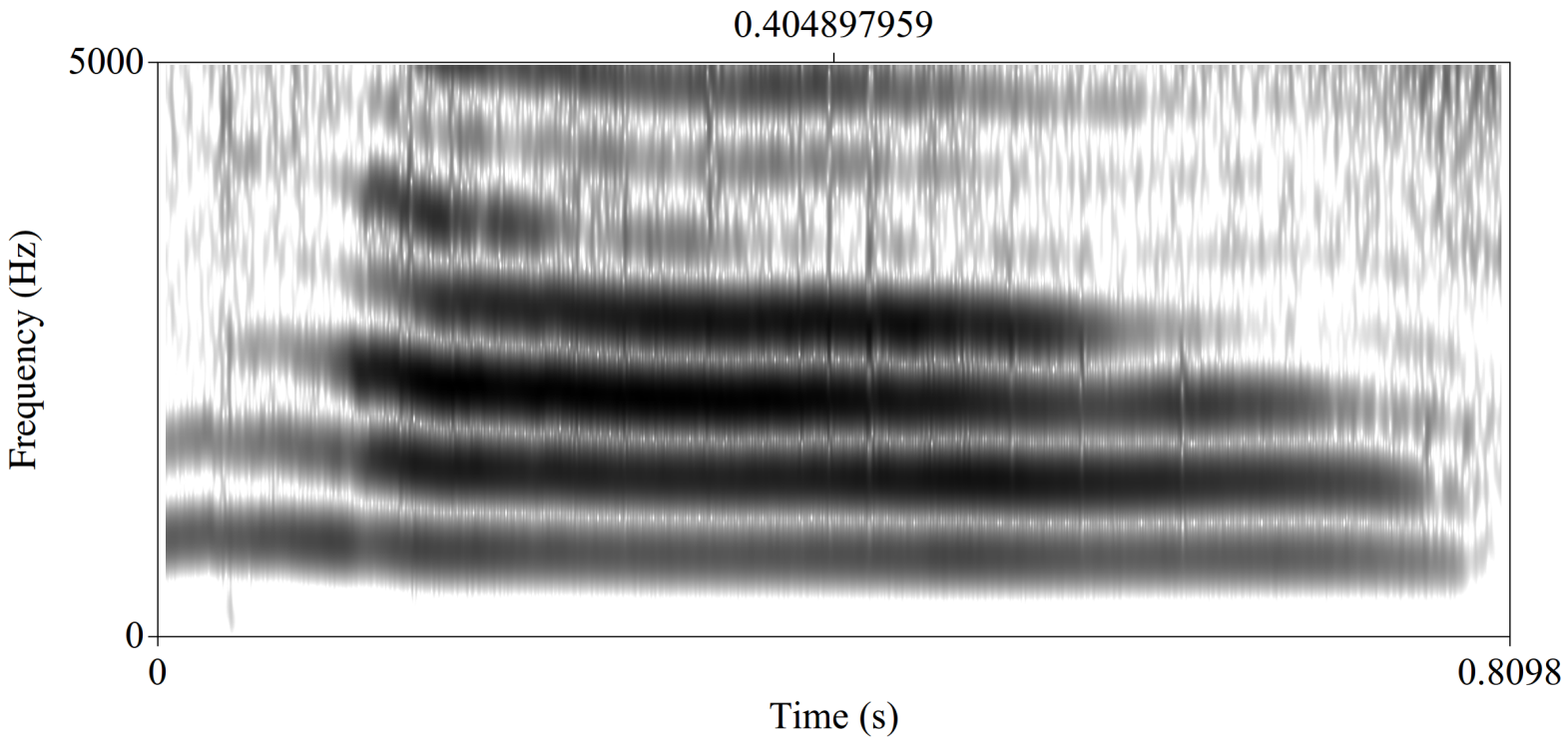
The output energy (at the mouth) for a given frequency is equal to the amplitude the source harmonic, multiplied by the magnitude of the filter function for that the frequency.

???

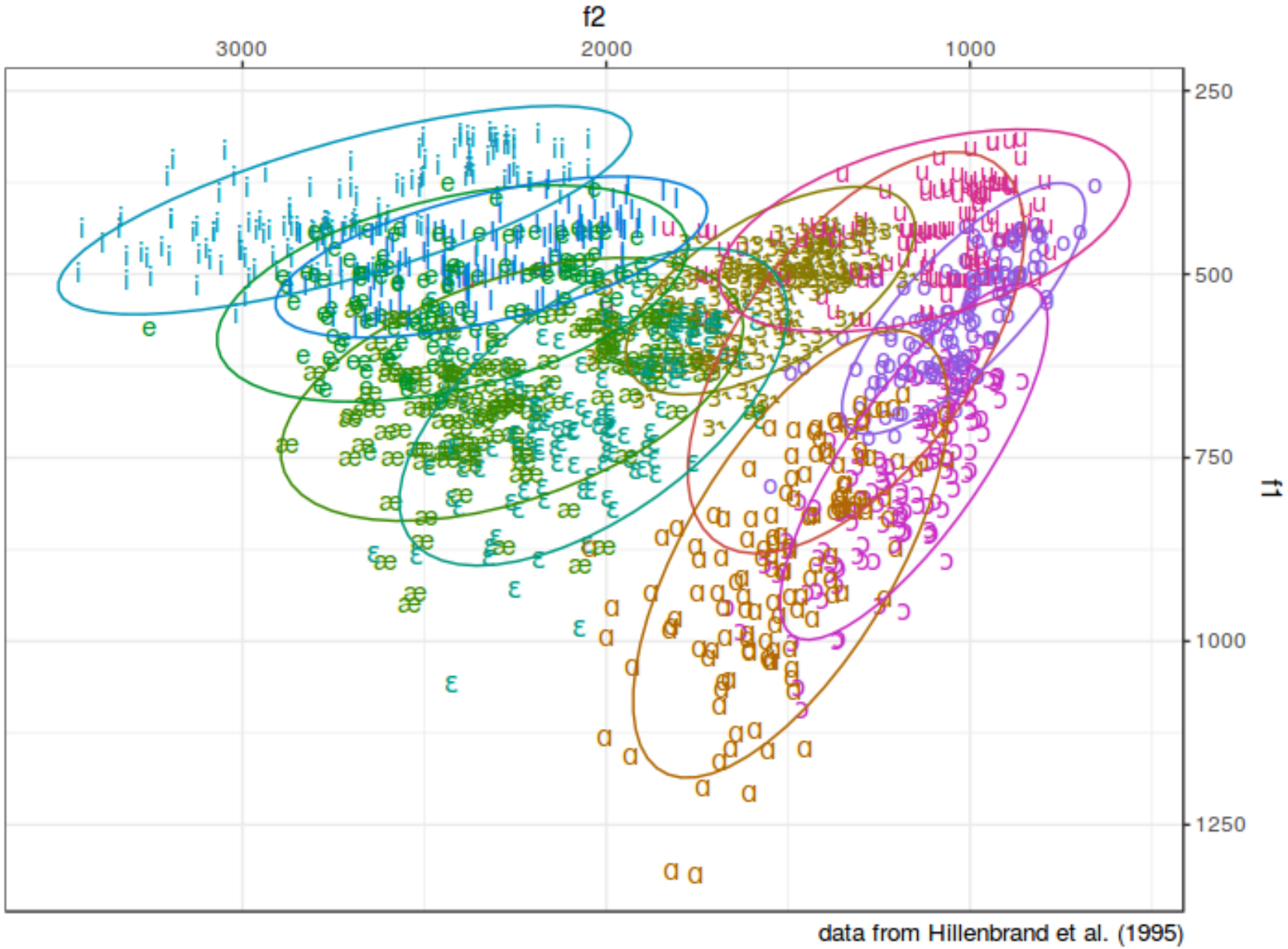


презентация доступна:

Cat meow



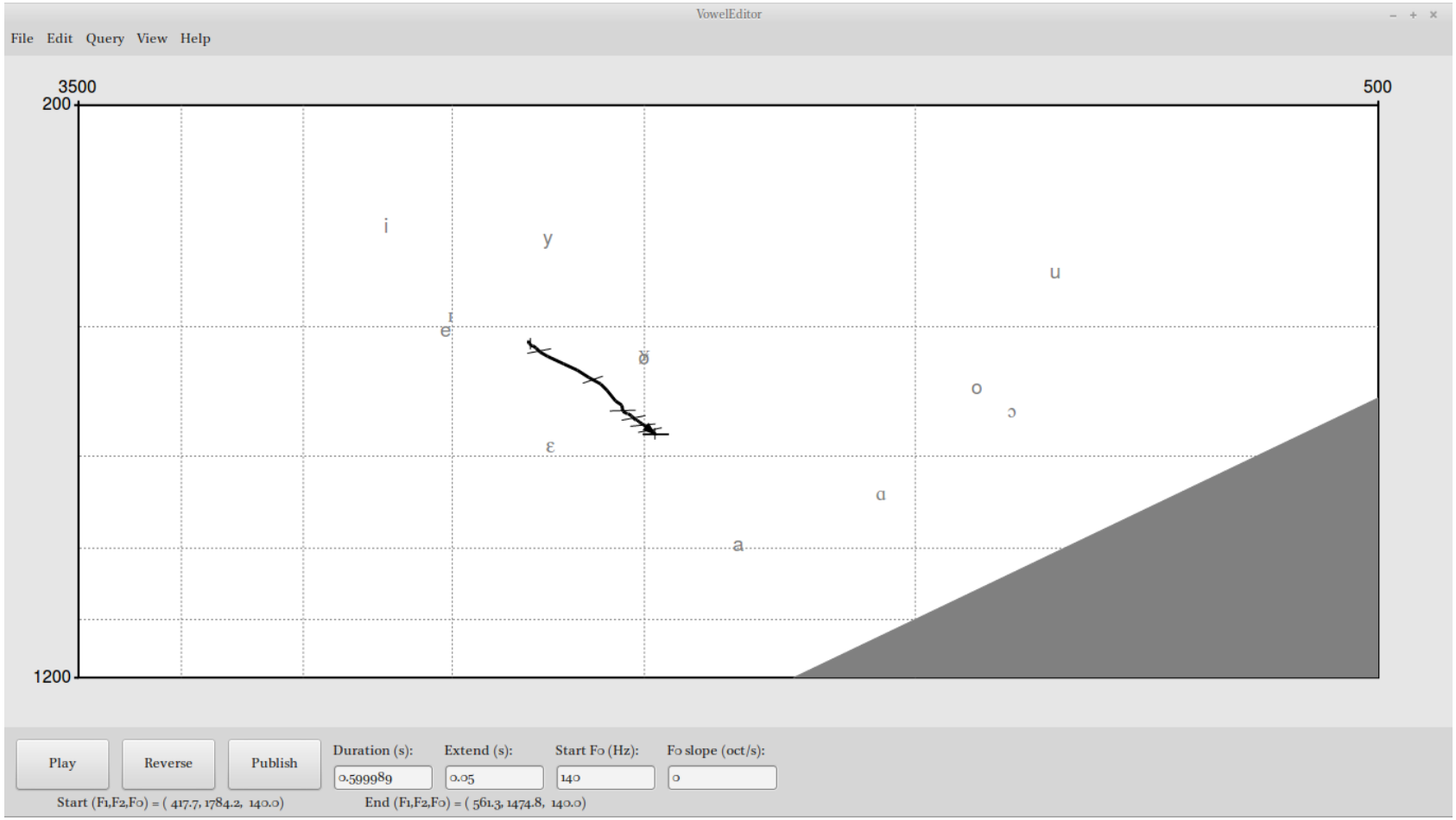
Vowel chart



презентация доступна:

Vowel editor

Praat objects > New > Sound > Create sound from VowelEditor...



How to analyse vowels?

- record sounds
- annotate sounds
- make an exploratory analysis
- extract duration and formant information from your data
- create the plot

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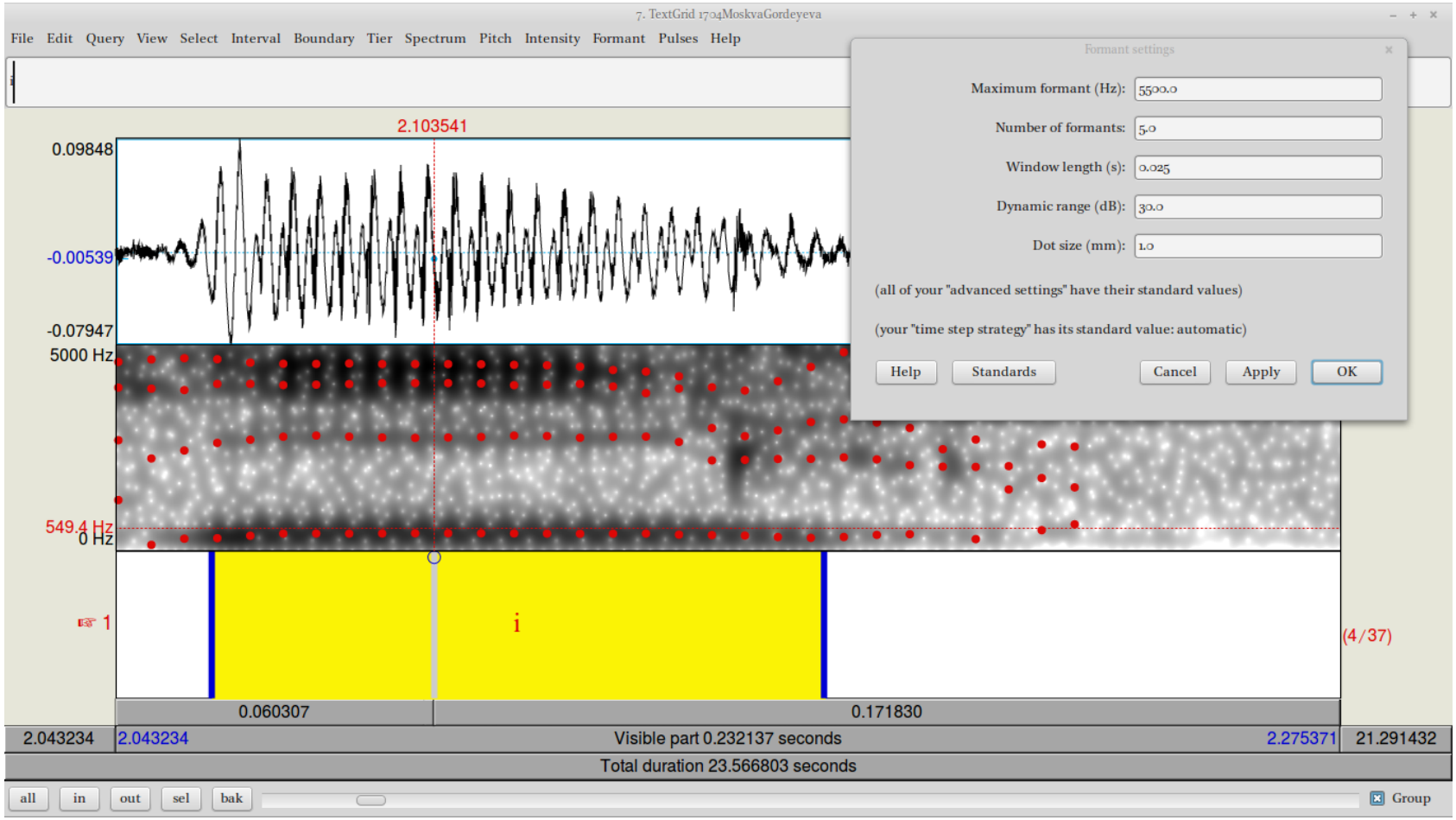
Formants in Praat

Praat Analyser > Formant > Show Formants



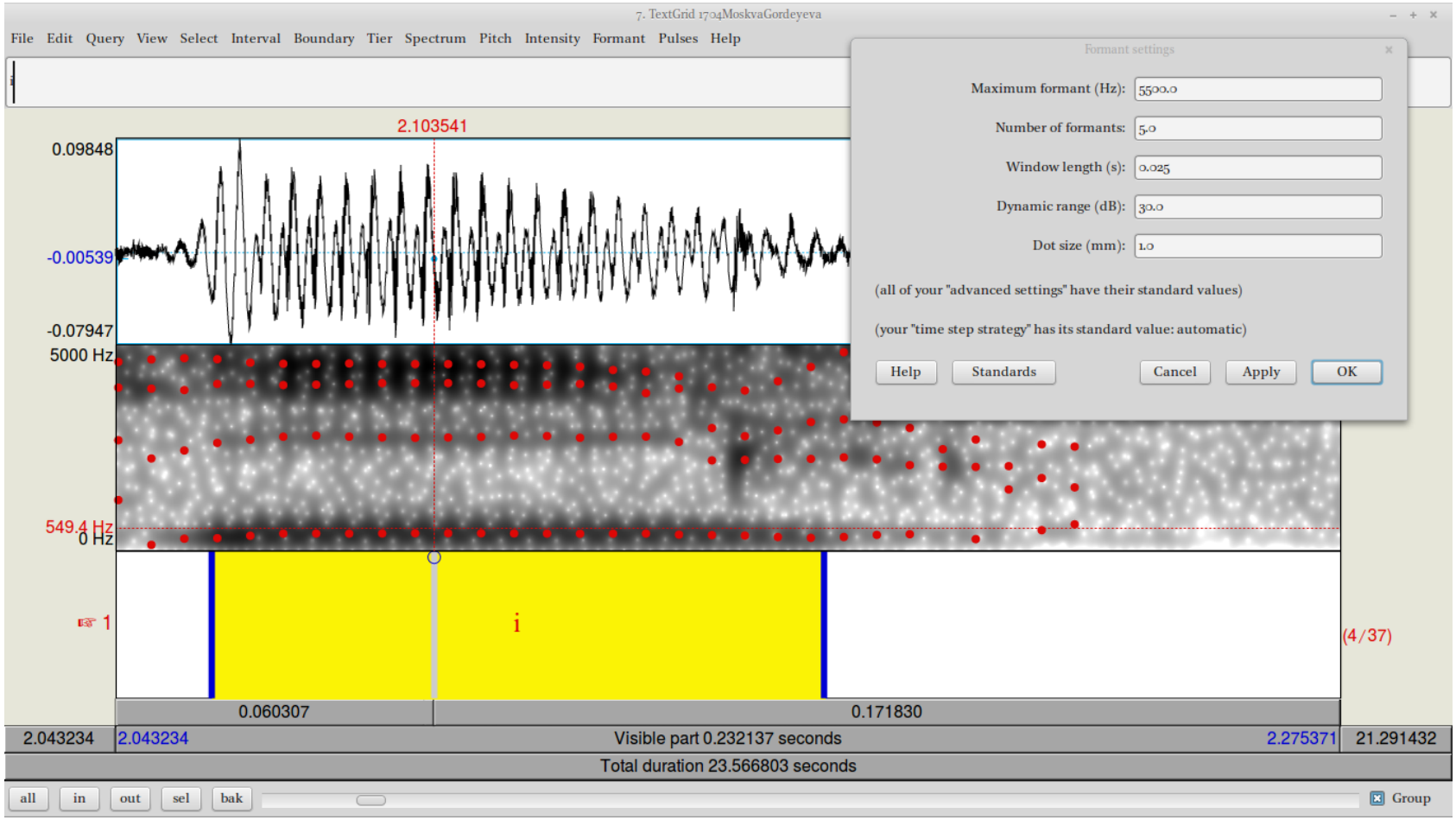
F1 select the nearest first formant value or mean value for selection

F2 select the nearest second formant value or mean value for selection

F3 select the nearest third formant value or mean value for selection

Formants in Praat

Praat Analyser > Formant > Formant Settings...



During analysis you should set Maximum Formant value so as to distinguish [i], [a] and [u].

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Change writing preferences to UTF-8!

Praat Objects > Preferences > Text writing preferences...

Praat scripting

Praat have its own scripting language. You can read about it:
Praat Objects > Help > Scripting tutorial
There are a lot of Praat scripts here.

Praat scripting: extracting duration

- Open Praat Objects
- Open some TextGrid
- Praat Objects > Praat > New Praat script
- Copy script from here to the new window
- Select TextGrid
- Praat Script > Run > Run
- Provide some valid path for the result file
- Press OK

Praat scripting: extracting formant values

- Open Praat Objects
- Praat Objects > Praat > New Praat script
- Copy script from here to the new window
- Praat Script > Run > Run
- Provide some path with your sound and TextGrid
- Provide Maximum Formant value
- Press OK

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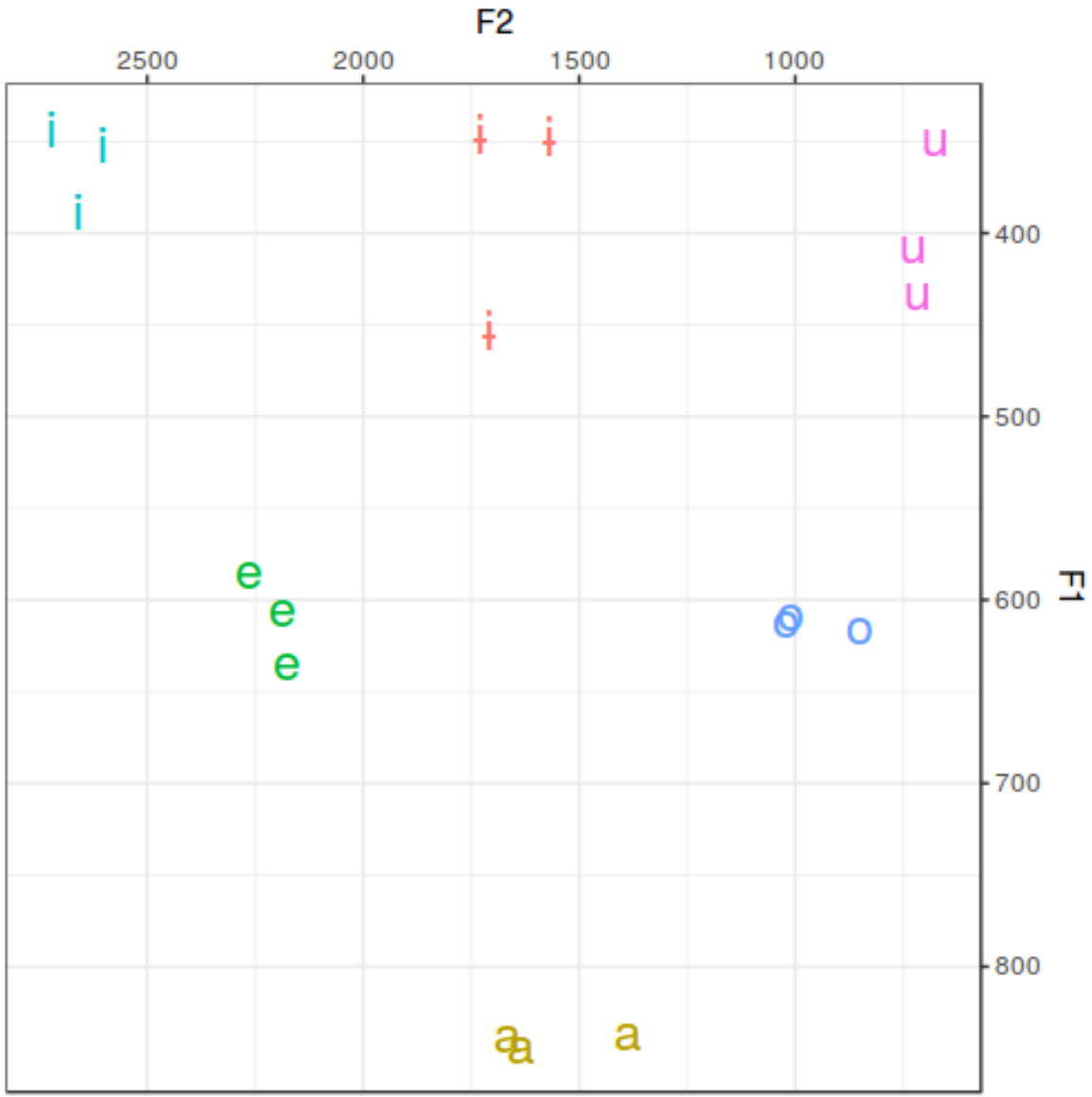
Plotting formant values with ggplot2

```
library(ggplot2)
setwd("...") # Put here path with the result.tsv file
df <- read.csv("result.txt", sep = "\t", fileEncoding = "UTF-8")
ggplot(data = df, aes(F2, F1, color = intervalname, label = intervalname))+
  geom_text(show.legend = F)+
  scale_y_reverse(position = "right")+
  scale_x_reverse(position = "top")
```

Plotting formant values with ggplot2



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vowels

- Version: 1.2-1
- Date: 2014-11-14
- Author: Tyler Kendall and Erik R. Thomas, [**?**]

```
install.packages("vowels")
```

phonTools

- Version: 0.2-2.1
- Date: 2015-07-30
- Author: Santiago Barreda, [?]

```
install.packages("phonTools")
```

Thank you!

Please, don't hesitate to write me

agricolamz@gmail.com

презентация доступна:

Reference

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