Hoole, Akustik
Übung Quelle-Filter-Trennung

After logging on to the matlab account:
```
cd akustikfort/sourcefiltergame
praat
```

It is also possible to use Praat on your own Linux-account.
Then you will need to copy the necessary wav-files:
```
cp ~matlab/akustikfort/sourcefiltergame/ja*.wav .
cp ~matlab/akustikfort/sourcefiltergame/nein*.wav .
```
(The sounds can also be downloaded from the course web-site.)

Source-filter games: Hybrid speakers

For this exercise sounds of two different speakers have to be loaded.
The exercise will be more interesting if you can use two speakers who clearly differ in vocal tract length, or F0, or at least in the intonation contour of their utterances.
The exercise will also work best if the utterances used are completely voiced and have a similar temporal structure.
The following sounds are ready for use:

ja_m.wav	"Ja", male speaker, rising intonation
nein_m.wav	"Nein", male speaker, falling intonation
ja_w.wav	"Ja", female speaker, falling intonation
nein_w.wav	"Nein", female speaker, rising intonation

(If you want to try this exercise with sounds that you have recorded yourself then refer to the additional preliminary steps below before continuing with "Main steps")

<u>**Main steps**</u>
Start with one of the combinations of different speakers saying different words, e.g ja_m and nein_w.
For each sound do
```
Formants and LPC > To LPC (autocorrelation)
```
Choose a prediction order of 12 (based on rule of thumb of (2 x number of formants) + 2)
(We expect about 5 formants in the frequency range up to 5512.5 Hz (= samplerate / 2).

Rename the resulting LPC object by adding 'filter_' to the beginning of the name (e.g. filter_ja_m, filter_nein_w).

Select the sound AND the corresponding LPC object and then select
```
Filter (inverse)
```
Rename the new sound object by adding 'source_' to the beginning of the name (i.e source_ja_m, source_nein_w).
Listen to it. You should hear the intonation contour, but no sounds should be identifiable.

Now select the source of Speaker 1 (source_ja_m) and the LPC object of Speaker 2 (filter_nein_w), and then choose 'Filter' (check the 'Use LPC gain' box)

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Rename the new sound to 'source_ja_m_filter_nein_w'.
Repeat for the other combination (source_nein_w with filter_ja_m).

For these two hybrid speakers, the identity of the speech sounds spoken will be determined by the speaker providing the filter function, and the F0 and intonation contour will be determined by the speaker providing the source function.

Repeat for the other combination of different speaker and different utterance (nein_m and ja_w).

If time, try out the combinations of different speakers saying the same word (but with different intonation contour), e.g ja_m and ja_w; nein_m and nein_f.
It is, of course, also possible to change the intonation contour of the same speaker, e.g ja_m and nein_m.

Additional preliminary steps for new sounds
For both sounds do
`Convert > Resample > New sampling frequency (Hz) = 11025`
(This is just to ensure both sounds have the same sample rate, and is sufficient if we are only using vocalic sounds.)

For both sounds do
`Modify > Subtract mean`
and
`Modify > Scale peak (0.99)`
(This ensures that the sound level of both sounds is comparable)

For each sound use
`Convert > Extract part`
to extract a portion of the same length from each signal, e.g half a second at the centre of each utterance
i.e set 'time range' to start and end of the portion to be extracted (use the edit window to figure out appropriate values for each sound). The setting for 'window' should be 'rectangular'.

Then proceed with "Main Steps" above.