

## SPEECH FORMANT GENERATOR

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### 1. INTRODUCTION

According to the widely accepted speech production model, voiced speech can be thought of as the result of a source (the glottal pulse) activating a linear filter network (the vocal tract).

The relatively steep edge of the source waveform causes the source to be a wideband frequency generator so that the frequency contents of the output are 'modelled' by the vocal tract filter function and maxima of this function correspond with maxima (i.e. formants) in the frequency distribution of the output.

In different terms: within each period of the fundamental frequency the steep edge of the glottal pulse excites the vocal tract cavities which produce damped oscillations in their natural frequencies.

During each period of the fundamental frequency the output can be regarded as the composition of a number of damped sinusoids or formants.

In practice, many deviations from this ideal model occur; however, commonly applied analysis and synthesis techniques are based on this concept and parts of speech can be conveniently described by using parameters in accordance with this model.

Therefore, a generator producing an output which consists of several damped sinusoids with variable parameters can form a valuable tool in the speech research field.

When designing such a generator two different targets must be distinguished; one of them being the realisation of a generator which produces a vowel signal, sounding as natural as possible, the other being the construction of a device which produces a signal corresponding with the function of a simplified model of the speech production.

We entered the latter concept because of its universal applications such as:

- generating simple signals for perception experiments;
- testing and judging various signal analysis methods;
- practical instruction aid for students, etc.

