

SynthChallenge 2022

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Description of used techniques

1 Superb by Škoda auto

First task was to synthesize sound of the electric vehicle Superb by Škoda auto according to given car motion control and video.

I decided to only use the car's speed and engine RPM as the base for the synthesis.

The speed was simulated by synthesised wind sound with amplitude nonlinearly dependent on the vehicle speed, implemented in `speedsynth.m` function.

The engine sound was created from a royalty free sample obtained from [1]. In function `powersynth.m` I created for engine sound adjustments, I used `shiftPitch` function to change the pitch of the engine sound based on the provided engine RPM values.

2 Barcarolle

As a second task Barcarolle was chosen to synthesize. The attached file consists of piano and string ensemble tracks. However I decided to replace some of them with other instruments.

To synthesize **piano** I used additive synthesis with envelope. This sound was placed into the "Ruby Room" by using digital reverb via `konv_reverb.m` function I wrote.

As a second instrument to synthesize I choose **violin**. For this part I decided to use nonlinear synthesis using Chebyshev polynomials.

Third instrument I implemented was **French horn**. For this part I used formant synthesis to realize the selected musical instrument. The signal was excited by pulses and then filtered with the designed resonant filter.

3 References

The materials I used in this work mainly consist of materials provided in the Audio signal synthesis course.

References

- [1] *110,000+ free sound effects for download - pixabay*. URL: <https://pixabay.com/sound-effects/>.