

ACOUSTICS2008/902
A synthesis and analysis framework for wind instrument sounds
based on the digital pulse forming principle

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A digital real-time-capable analysis- and synthesis-system for wind instrument sounds, based on the pulse forming theory, has been developed. The rediscovered model for the sound generating process of wind instruments rests upon the idea, that wind instrument sounds can basically be put down to its excitation impulses, which independently of the fundamental always behave according to the same principles. First realised in the analogue wind instrument synthesizer Realton Variophon (1975), the sound synthesis method has currently been transferred onto a digital platform [supported by the German Research Foundation]. Instrument specific algorithms control the pulse width and shape according to the applied pitch and dynamic values. That way subtle sound nuances that can be produced on acoustic wind instruments as well as real timbre modulation may be synthesized by just modifying a single parameter (i.e. breath pressure). In order to validate the performance of the developed framework, several perception experiments were conducted subsequently.