

Manorth Kanjanapen 2012: Discrete Model for Digital Sound Synthesis of String Instruments by Using the Functional Transformation Method. Master of Science (Physics), Major Field: Physics, Department of Physics. Thesis Advisor: Assistant Professor Surasak Chiangga, Dr.rer.nat. 42 pages.

This thesis studies the application of the functional transformation to solve the partial differential equation (PDE) describing the vibration of guitar string. A multidimensional transfer function was obtained by suitable transformation with respect to time and space on the PDE for the corresponding initial-boundary value. The transverse vibration of guitar string B which takes the excitation function into account was demonstrated and illustrated as an animation. The sound synthesis was generated by transformation of the PDE to a low order recursive digital filter with well-known continuous-to-discrete transformations. It is found that our algorithms were suitable for real-time implementation on digital signal processing and has the advantage of exact solutions with stable, computationally effective systems.

---

Student's signature

---

Thesis Advisor's signature