

## **Analysis of the Relationship between the Unitary Impulse Response for the nth-Volterra Kernel of a Duffing Oscillator System**

**Authors :** Guillermo Manuel Flores Figueroa, Juan Alejandro Vazquez Feijoo, Jose Navarro Antonio

**Abstract :** A continuous nonlinear system response may be obtained by an infinite sum of the so-called Volterra operators. Each operator is obtained from multidimensional convolution of nth-order between the nth-order Volterra kernel and the system input. These operators can also be obtained from the Associated Linear Equations (ALEs) that are linear models of subsystems which inputs and outputs are of the same nth-order. Each ALEs produces a particular nth-Volterra operator. As linear models a unitary impulse response can be obtained from them. This work shows the relationship between this unitary impulse responses and the corresponding order Volterra kernel.

**Keywords :** Volterra series, frequency response functions FRF, associated linear equations ALEs, unitary response function, Volterra kernel

**Conference Title :** ICSRD 2020 : International Conference on Scientific Research and Development

**Conference Location :** Chicago, United States

**Conference Dates :** December 12-13, 2020