Discrete orthogonality of the Malmquist Takenaka system of the upper half plane and rational interpolation

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The classical Fourier bases has been proved to be an efficient approach to represent a linear and stationary signals. However it is not efficient to represent a nonlinear and stationary signal. For this purpose it is more efficient the use of some special orthonormal basis of rational functions.

In the case of the unit disc it is used the well known Malmquist- Takenaka system. The first N elements of the Malmquist-Takenaka system are also discrete orthonormal regarding to a discrete scalar product over the unit circle.

There is an analogue of the Malmquist-Takenaka system for the upper half plane. We will prove the discrete orthogonality of the Malmquist Takenaka system for the upper half plane. Based on the discretization we introduce a new rational interpolation operator and we will study the properties of this operator.

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