

Generalized Silver Means Subfamily

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The well known Silver Mean $\sigma_{Ag} = 1 + \sqrt{2}$ is one of the members of the Metallic Means Family (MMF). The MMF was defined by the author [1] as the set of positive eigenvalues of the matricial equation

$$\begin{pmatrix} G(n+1) \\ G(n) \end{pmatrix} = \begin{pmatrix} p & q \\ 1 & 0 \end{pmatrix} \begin{pmatrix} G(n) \\ G(n-1) \end{pmatrix}$$

for different values of p and q (natural numbers), where $G(n)$ is a "generalized secondary Fibonacci sequence"

$$a, b, pb + qa, p(pb + qa) + qb, \dots$$

that satisfies the relation

$$G(n+1) = pG(n) + qG(n-1)$$

with $G(0) = G(1) = 1$.

In this paper we are going to introduce a subfamily of the MMF, based on certain generalized Silver Means. This generalized Silver Means subfamily may be used:

1) to support the Silver Mean conjectures that indicate the important role this number plays in quantum analysis, when using certain geometries given by monotone metrics, imposable on the 15-dimensional convex set of two-qubit systems;

2) to analyze spectral properties and anomalous diffusion in Silver Mean (oc-tonacci) quasi-crystals.

1. Spinadel Vera W. de, "From the Golden Mean to Chaos", first edition 1998, ed. Nueva Librería ISBN 950-43-9329-1. Second edition 2004, ed. Nobuko, ISBN 987-1135-48-3.