

Visualizations of Sinusoidal Spirals, Limacons of Pascal, and Conic Curves using Equiangular Spirals of Secondary Metallic Ratios

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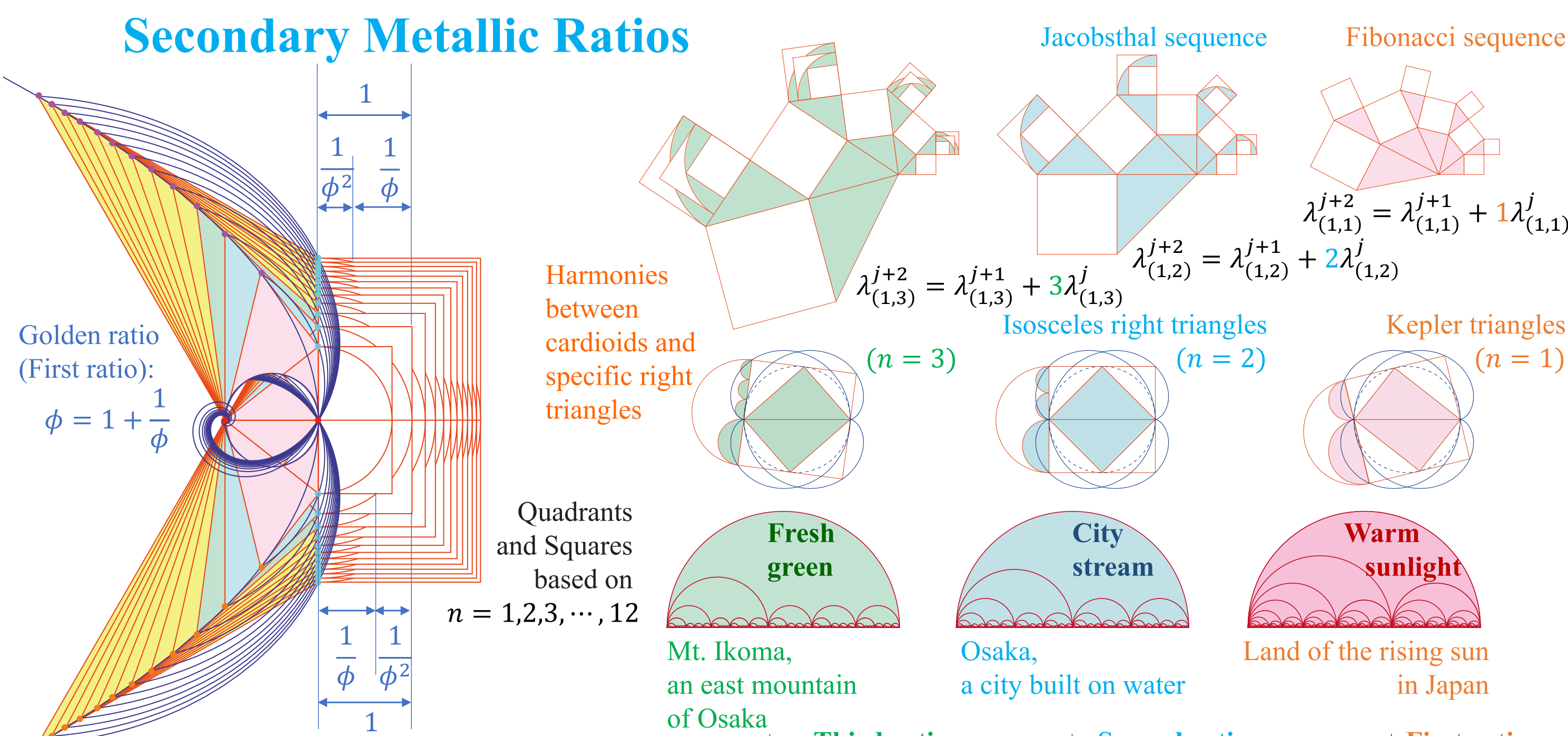


Acknowledgements:

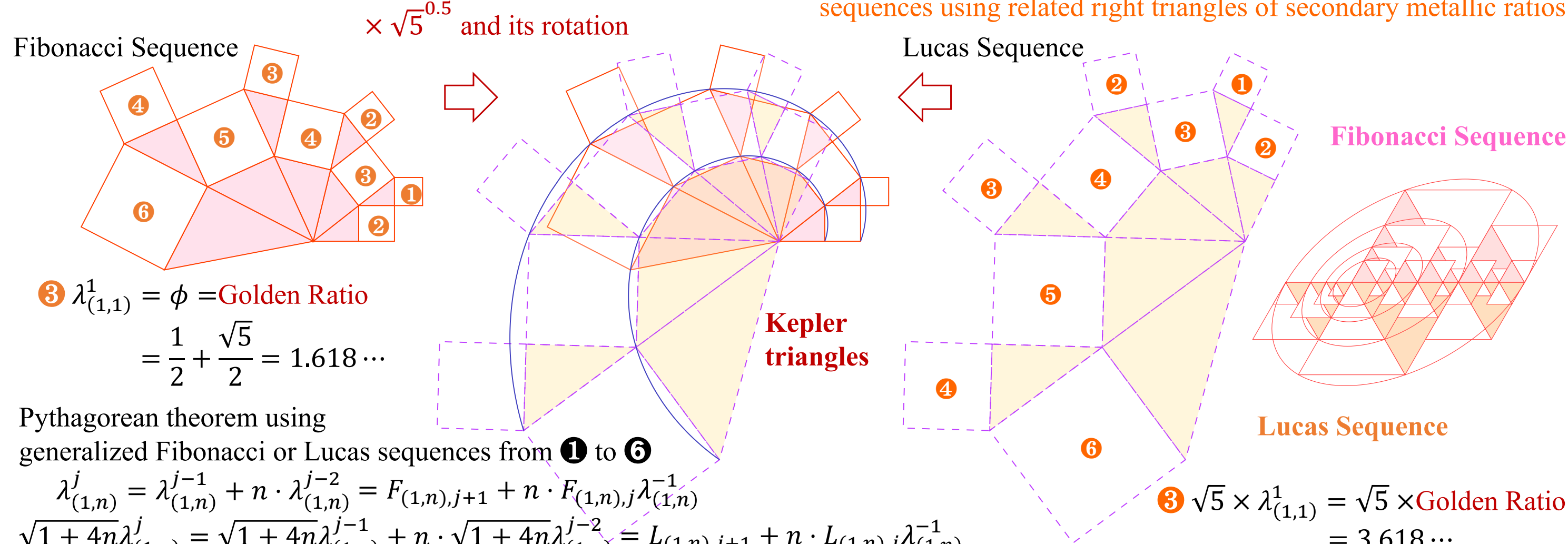
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Original References:

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 URL: <http://www.oit.ac.jp/center/~nakanishi/english/>



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This study aims to investigate the geometry of secondary metallic ratios proposed by de Spinadel in the poster of this conference. Equiangular spirals and related right triangles using the secondary metallic ratios indicate various fundamental shapes based on sinusoidal spirals coincidentally. The relation between the order of sinusoidal spirals and x-th power of the equiangular spirals should be verified as a simple unique equation precisely. Conic curves such as parabolas, hyperbolas, and ellipses with two types of equiangular spirals create geometrically beautiful harmonies with some sinusoidal spirals such as cardioids, lemniscates, Cayley's sextics, and Tschirnhausen cubics from artistic viewpoint respectively. Similarly, limacons of Pascal including cardioids can be illustrated concisely using the reverses of related right triangles based on equiangular spirals. Even though we explain that in the field of the plane geometry, we can also display the lemniscates with toruses and hyperbolas with cones as 3-dimensional graphics to confirm the concepts using the equiangular spirals and related right triangles more theoretically.

