




# A Study of the Roughness of Gothic Rose Windows

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**Abstract** The rose window is one of the most representative elements of Gothic art and architecture. In this work we analyze fifteen rose windows from fifteen Gothic cathedrals using fractal geometry. Specifically, we examine the texture and roughness of these rose windows focusing on three factors, their designs, glass areas and solid areas. In this investigation we generate parameters which provide a measure of roughness of the rose windows in order to find out if they show a general non-random fractal pattern. The paper concludes that statistically, there is a characteristic fractal pattern in the solid and glass areas of the rose windows of the Gothic style, but not necessarily in their overall design.

**Keywords** Rose windows · Gothic architecture · Fractal geometry · Fractal parameter

## Historical Background: Light in the Gothic Cathedral

The Gothic style signaled a veritable revolution in architecture as a result of its technical innovations which challenged the conventional concepts of construction at the time and also changed the manner in which large indoor spaces were conceived. Louis VI, King of France, aspired to rule all of the vast territories which had formed the Carolingian Empire three centuries before. To achieve this aspiration he was assisted in this task by Abbot Suger of Saint-Denis, an advisor with both intelligence

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