



A Harmonic Analysis of the Façade of Gaudí's Pedrera

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Abstract

La Pedrera, an emblematic building designed by Antoni Gaudí, is distinguished by the undulating and continuous profile of its façade, thus establishing it as an iconic landmark of Catalan Art Nouveau. The present study proposes a harmonic, descriptive analysis of these undulations, with the aim of exploring their regularity, structure and formal coherence from a mathematical perspective. In order to achieve this objective, high-precision 3D laser scanning techniques and Fourier transform analysis are utilised to disaggregate the geometry of the façade into its constituent frequency components. The results provide a quantitative reading of the undulating rhythm of the surface, revealing harmonic patterns that contribute to understanding the design of the façade from a geometric and systematic approach.

Keywords Antoni Gaudí · La Pedrera · Waves · Fourier transforms

Introduction

La Pedrera, the magnum opus of Antoni Gaudí, is distinguished not only by its architectural significance within the context of Catalan Art Nouveau, but also by the distinctiveness of its undulating façade (Fig. 1). This formal characteristic has long been of interest to architects, historians and artists, although it has rarely been analysed from a rigorously geometric perspective (Asarta 1998; Bassegoda i Nonell 2002; Giralt-Miracle 2002; Salas Mirat et al. 2018).

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