

Revisiting the “*M Stadium*” Project by Luigi Moretti: A Forgotten Model of Parametric Architecture

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Abstract

Nowadays the term parametric modeling or design refers to a computer-aided design process where digital representation and interactive computation allow designers to have complete freedom on their designs' form and sometimes behavior. However, the term historically did not reflect such a freedom. In his article entitled “*Forme comme Structure*” published in 1953 on the “*United States Lines Paris Review*” [1] Italian architect Luigi Moretti (1907-1973) defined it as: “*The enumeration of the parameters, scientific research, the quantitative mathematical analysis of these parameters, these form a task to be tackled a priori by the new architecture in every case. There will thus be born that architecture I have long demanded, and to which I gave the name parametric. Its ineluctable geometrical character, the rigorous interconnection of its forms, the absolute freedom of phantasy itself which can spring up where equations cannot fix their own roots all this will give it a crystal splendor*”. According to Moretti, parametric architecture is thus expressed through mathematics and the exploration of parametric equations [2]. Therefore, this study revisits Moretti's work on the IRMOU's “M Soccer Stadium” project, designed for the XII Triennale Exposition of Milan in 1960, in order to understand his mathematical form-finding approach to architecture and to examine the consequences of this approach on structural design. The mathematically generated shape of the “*M Stadium*” based on “*iso-visibility curves*” is thus recreated and explored through three-dimensional modeling. The mathematical expression $W = d_1^x (e^{-kx}) + d_2^x (e^{-kx})$ that rules the design is further analyzed and the influence of its parameters is investigated using current graphical techniques. Moreover, the implications of Moretti's mathematical form-finding on the load bearing structure, as well as its performance, are evaluated through structural analyses, while novel forms are proposed through dialectic form-finding.

References

- [1] M. Coudeyre, United States Lines Paris review, 1954.
- [2] C. Beguinot, G. Esposito, and Fondazione Aldo Della Rocca, *Luigi Moretti e la Fondazione della Rocca: urbanistica e ricerca operativa*. Roma: Progetto, 2009.