

# **Spatial Properties of Frank Lloyd Wright's Prairie Style: A Topological Analysis**

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## **Statement of Originality**

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*To my father*









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# List of abbreviations

In the following list, only the major recurring abbreviations are listed.

<b>AID</b>	Angular interspatial depth
<b>AMD</b>	Angular mean depth
<b>D-K</b>	Dining room - kitchen (depth)
<b>DxK</b>	Dining room to kitchen (axial line)
<b>DxL</b>	Dining room to living room (axial line)
<b>E-D</b>	Entry - dining room (depth)
<b>E-K</b>	Entry - kitchen (depth)
<b>E-L</b>	Entry - living room (depth)
<b>HIAL</b>	Highly integrated axial line
<b>HIX</b>	Highly integrated intersection
<b><i>i</i></b>	integration
<b>I</b>	Prairie house type 1
<b>IA</b>	Isovist area
<b>IA1</b>	First subtype of type I
<b>IA2</b>	Second subtype of type I
<b>IB1</b>	Third subtype of type I
<b>IB2</b>	Fourth subtype of type I
<b>II</b>	Prairie house type 2
<b>IIA</b>	First subtype of type II
<b>IIB</b>	Second subtype of type II
<b><i>k</i></b>	The number of nodes in a graph, or of cells in a grid. If used with a subscript (e.g. $k_r$ ), indicates the number of nodes or grid cells in space $r$ .
<b>L-D</b>	Living room - dining room (depth)
<b>L-K</b>	Living room - kitchen (depth)
<b><i>p</i></b>	(usually as $p$ -value) the probability of randomness or null hypothesis, as the indicator of statistical significance.
<b>SID</b>	Step interspatial depth
<b>SMD</b>	Step mean depth
<b>SxL</b>	Service zone to living room (axial line)



# Abstract

Frank Lloyd Wright's Prairie houses have been repeatedly praised for introducing a number of innovations in domestic spatial planning. In particular, historians and critics have identified several properties as signalling a departure from the formal characteristics of Victorian architecture of the United States. However, despite these claims, the actual spatial properties of the Prairie houses, whether in comparison to the Victorian houses or to themselves, have never been quantified. A quantitative analysis would enhance the objective understanding of this style. Hence, this thesis presents the results of a two-stage computational analysis of Prairie houses using space syntax techniques. The thesis analyses the floor plans of twenty-seven Prairie houses and fifteen Victorian houses. In the first stage of the research, the Victorian and Prairie houses are compared in order to investigate the claims in the literature as well as to identify any overlooked similarities or differences between the two design trends. In the second stage of research, only the Prairie houses are analysed in order to understand the differences and similarities between them, especially in regard to their diverse layout characteristics.

The results of the first stage suggest that, within the limits of the methods used, the Prairie houses were not so inventive as claimed in previous studies. Nevertheless, the thesis also identified possibilities for alternative interpretations of the results that might begin to explain this accepted position. In addition, the results of the first stage identified a number of previously unknown features (such as genotypes) in both Victorian and Prairie houses. The results of the second stage showed that the Prairie houses are significantly diverse in regard to their spatial properties. The thesis also found that there is a limited relationship between some of the measured layout features of the measured spatial properties.

