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CELL COMPLEXES TOPOLOGICAL LINKS FOR BUILDINGS IN CITYGML

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Abstract. Topology has served as the foundation for analysis in modelling cities and buildings. CityGML as an international standard for 3D city modelling utilises a simple 'topology-incidence' which links connected geometries by reference without the presence of a complete topological model to explicitly preserve the topological properties. This paper explains the use of cell complexes topological links for buildings in CityGML. Two datasets were used in this study which consisted of two connected buildings and two disjointed buildings. The geometries which make up the buildings were extracted as 0D nodes, 1D lines, 2D surfaces and 3D buildings. The resulting topological links generated are from a-0 links to a-3 links where a-0 links are lines that connect nodes (1D), a-1 links are connected lines that form surfaces (2D), a-2 links are connected surfaces that makes up a building (3D) and a-3 links represents connections between 3D buildings. The connected buildings started with a generated total of 57 a-0 links which decreased to 2 a-2 links where each building is represented by 1 a-2 link. A similar result was obtained for the disjointed buildings where ultimately the buildings were individually represented by an a-2 link. Besides that, a-3 links could be generated for the connected buildings which described that building 0 was connected to building 1 and vice versa. This shows that the cell complexes topological links is a simple yet compact way of preserving topological properties and facilitating navigation through the connected objects.

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