

POLITECNICO DI TORINO
FIRST SCHOOL OF ARCHITECTURE
Master of Science in Architecture (Construction)
Honors theses

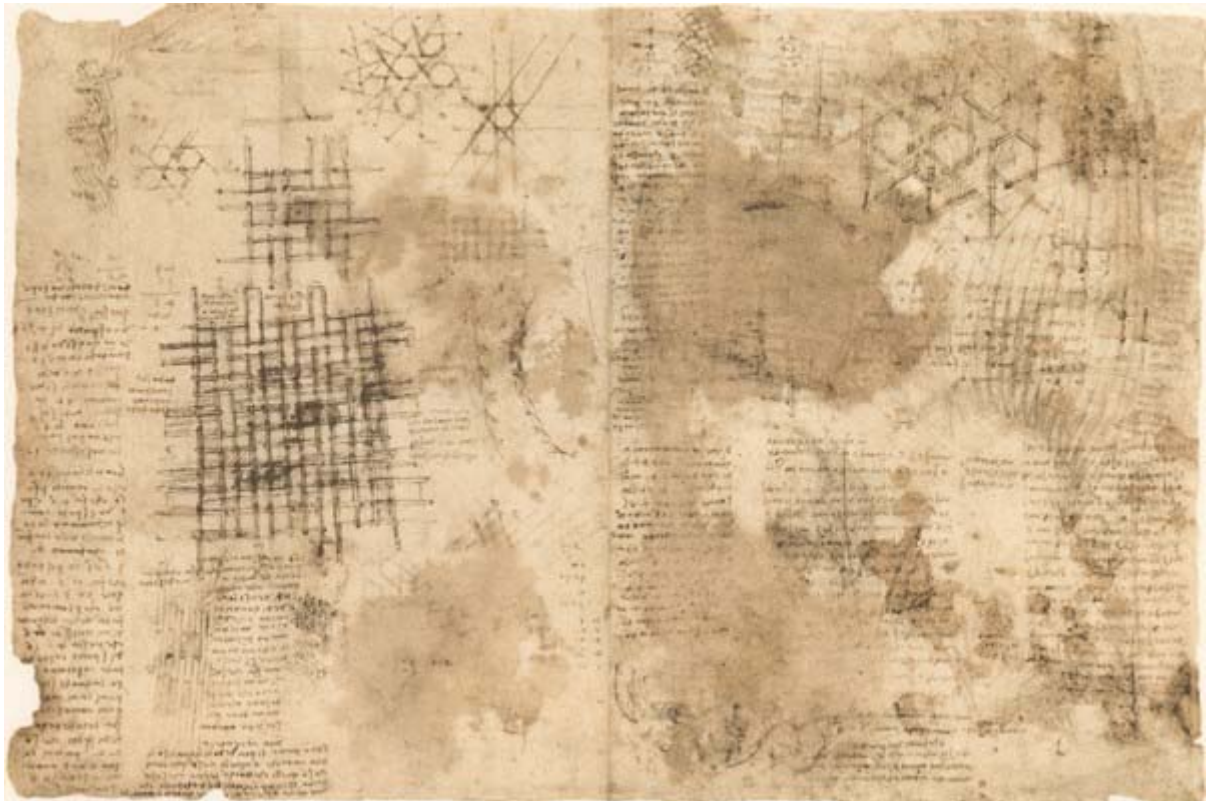
Reciprocal structures: static and cinematic behaviour

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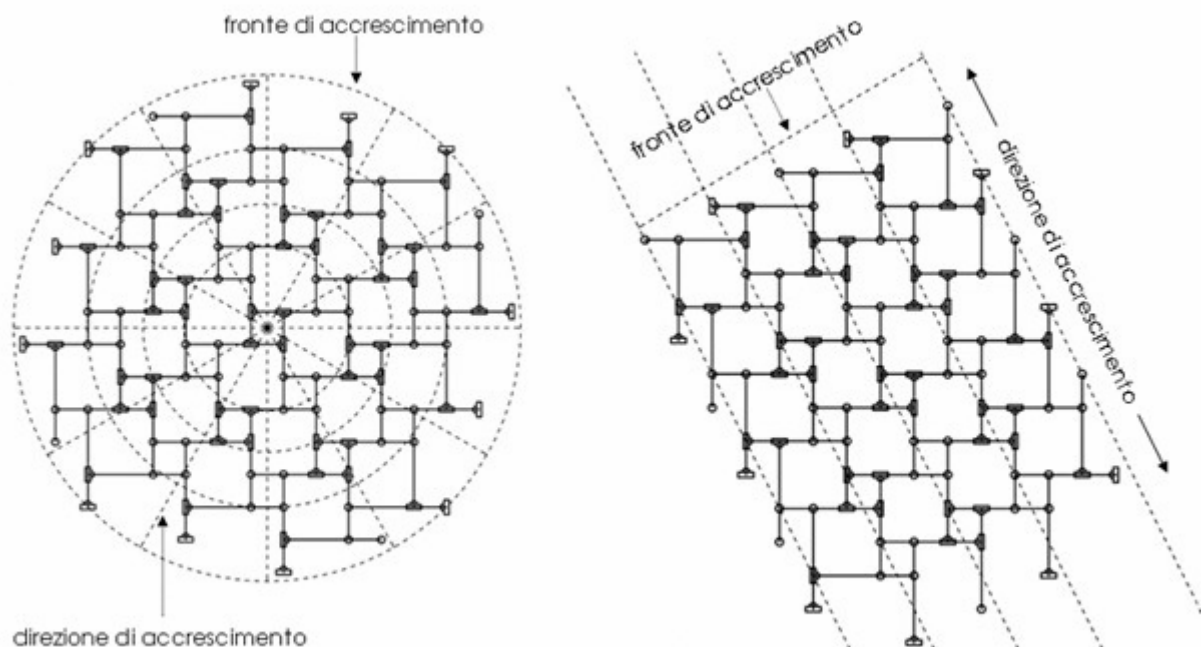
This work has been developed in order to investigate the static and cinematic properties of the reciprocal structures related to the realisation of itself. The analysed structures refers to the structural typologies which was given by Leonardo da Vinci in his Atlantic Code: the geometry of the studied structures is reported on the Code in page 899.



Leonardo da Vinci's Atlantic Code, page 899

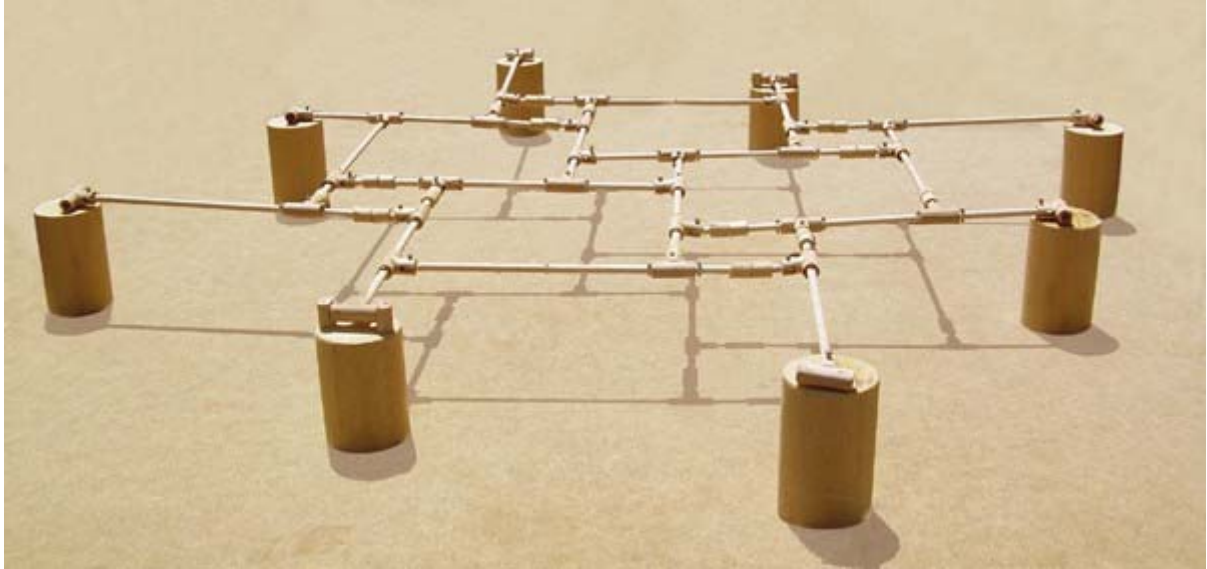
Reciprocal structures represent a particular structural typology in which every element is needed in order to sustain the next.

Defining the basic module which represents the minimal static configuration the work has been done by increasing the basic module through the adjoining of simple elements or modules which produces a new structural configuration for which we have analysed the new static-cinematic behaviours corresponding to the different applied load configuration. In order of the different structural typologies produced by analysing the basic modules related to the different bord conditions reproducing Leonardo da Vinci's typologies considering the load transmission between the nodal elements happening through the mobilised friction, we have focussed our attention on two particular structural configurations. The analysed structural configurations are obtained by applying two different generation criteria which permit a linear or a radial adjoining of elements or modules.



Generation criteria: linear and radial

Related to the numerical analysis performed on the defined structural typologies we have been able to derive some relationship which gives the possibility to obtain and evaluate the static determination degree of the structure. The static determination degree indicates isostaticity, lability or iperstaticity of our structural system.



Realised Structural Model

Finally we have considered the feasibility of the analysed structures in order to check the geometrical dimensions related to only one worker and depending of the usage of different material like, steel, wood and aluminium. The results of the exploiting typologies showed a range between five and twelve meters.

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