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Geometry in the Alhambra

In this talk we will make a summary in pictures of the geometric secrets of the Alhambra and its palaces, as a preparatory activity for the mathematical visit organized by International Seminar on applied Geometry in Andalusia.

The Alhambra of Granada, which has been enlisted to Unesco's human heritage, stands out for its geometric contents. Its architecture is organized in several modular blocks, which all together give rise to a high conceptual content. In particular, it is possible to find out some modular structures with classical geometric proportions: $\sqrt{2}$, the square or Cordovan Proportion, Φ , the Golden Number, and 2, the Double Square.

It has been said that the Alhambra is a tribute to the square and the proportions from it derived.

Concerning the decoration, the Nasrid Palaces are the paradigm of the geometric decoration. Geometry can be found everywhere in grounds, ceilings, walls and even in empty spaces, all of them geometrically decorated by pieces of wood or marble, plaster, coloured glazed tiles, doors, windows, columns, archs, and so on. This is why the Alhambra is considered a catalogue of geometric products of imagination, such as complicated knots and laces, beautiful dadoes and tessellations without rival.

In particular, the Alhambra is the only monument built before Fedorov's Theorem (1891) containing in its wall decoration at least one example of each of all of the 17 discrete groups with compact, connected fundamental domain, well-known as the plane crystallographic groups.

References

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