How the cadence characterizes a labyrinth.
Why Classical and Chartres labyrinths have elegant design.

by Willem Kuipers

A cadence is the rhythmic variation of the visual distance to the centre.

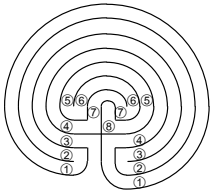
The cadence can be depicted graphically.
The graph offers easy insight in characteristic aspects of the labyrint.

Both classical and Chartres labyrinths are miracles of elegant design due to their non-trivial self-dual sequence of circuits.

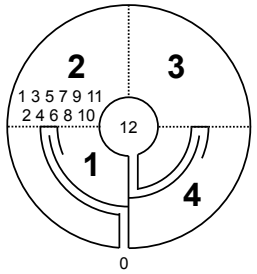
Article to appear in Caerdroia 31.

The cadence rules

- picture is XY-graph
- X-axis denotes consecutive 'steps' through circuit(-segments)
  - in Classical labyrinth: a step is arc between two turns
  - in Chartres labyrinth: a step is arc within a quadrant
- Y-axis denotes number of circuit, from outside inwards
- Graph is line connecting consecutive steps through circuits
- Graph shows inverse distance to the centre.
- In Chartres case, line breaks and changes colour when moving from one quadrant to another.

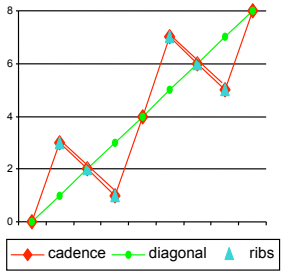


circuitnumbers and quadrants

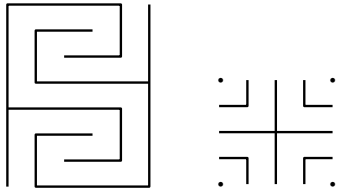


The cadence of the Classical labyrinth

classical 7-circuit cadence



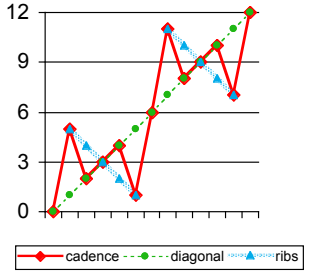
meander and seed pattern



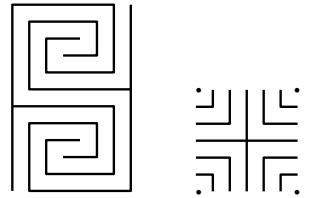
Note:
- rotational symmetry about step 4: self-duality:
  going inward or outward, sequence is identical.
- Even doubly self-dual about step 2 and 6, see graph and meander.
- Marking points are on diagonal and transverse ribs.
- General movement from outer circuits to inner circuits.

The cadence of the Classical labyrinth (continued)

classical 11-circuit cadence



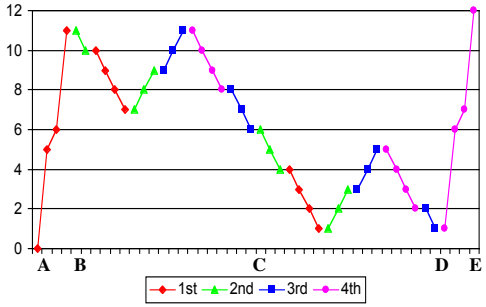
meander and seed pattern



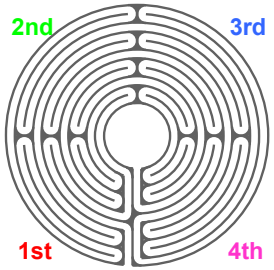
Note:
- Also rotational symmetry: self-duality about step 6
- Also doubly self-dual about step 3 and 9, see graph and meander.
  The meander gets symmetrically more entangled, preserving self-dualities.
- Marking points are again on diagonal and transverse ribs.
- Similar properties for 15-, 19- etc. circuit labyrinths.

The cadence of the Chartres labyrinth

11-circuit Chartres cadence



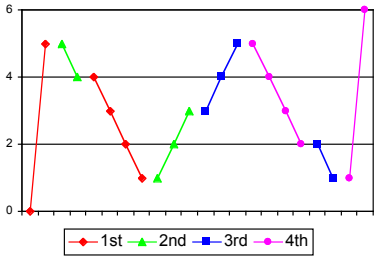
Chartres labyrinth



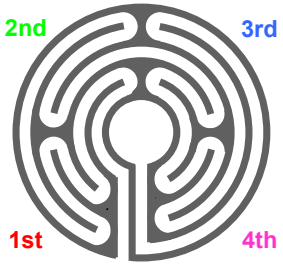
Note:
- rotational symmetry about the middle circuit (6th): self-duality
- doubly self-dual about 9th and 3rd circuit
- 5-circuit pattern between BC and CD, the characteristic Chartres family cadence.
- general movement from inner circuits to outer circuits, unlike Classical labyrinth.

The Chartres family cadence

5-circuit Chartres cadence



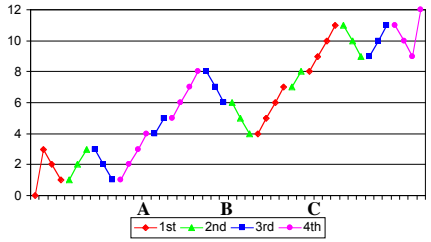
5-circuit Chartres labyrinth



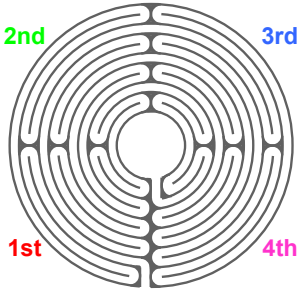
Note:
- Self-duality about 3th circuit;
  sequence going toward the centre is identical to sequence going out.
- Building block for 11, 17, 24 ... -circuit Chartres labyrinths, blocks separated by intermediate circuit (6th, 12th, 18th ...). Example: Saffron Walden.
- Only feasible when general movement is from inner to outer circuits.

An intriguing alternative: the Reims labyrinth

the Reims cadence



the Reims labyrinth



Note:
- Labyrinth is drawn circle-wise, unlike the original in Reims cathedral.
- Rotational symmetry: self-duality about 6th circuit (B).
- Inverted Chartres 5-circuit cadence between 4th and 8th circuit (AC).
- General movement is from outer circuits to inner circuits,
  like the Classical labyrinth and unlike Chartres.

Conclusions

- Depicting cadences is practical way to describe rhythm of labyrinths, like staff-notation is for music.
- Self-duality is powerful feature for balance of inward and outward movement.
- Both Classical and Chartres designs are doubly self-dual, and very regular without being trivial. A possible explanation for their success and proliferation.
- Different cadences will provide different experiences.
  Choosing a cadence could be a help for most appropriate experiences
- The Reims labyrinth could be a powerful form, combining four quadrants with a ‘Classical’ movement from the outer circuits to the inner ones.

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