

Visualization of Rhyme Patterns in Two Sonnet Sequences

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Abstract

The authors study end-rhyme patterns in two sonnet sequences by Christina Rossetti and Günter Grass. Color representations in bands and mappings into walks on directed graphs are used to visualize and interpret the structure of the end-rhyme patterns in the sonnet sequences.

For most of its history, poetry has been associated with mathematics (to the extent that the words “numbers” in English served as a synonym for verses from about 1600-1900). In modern European languages poetry has typically been organized around counting in one form or another: counting syllables, counting lines, counting rhymes, counting rhythmic beats. In this paper the authors analyze the end-rhyme patterns in two sonnet sequences -- Christina Rossetti’s (British, 1830-1894) *Monna Innominata* (1881, 14 sonnets) see [1] and Günter Grass’s (German, born 1927) *Novemberland* (1992, 13 sonnets) see [2] using colored bands and planar directed graphs.

The sonnet, a 14 line poem with 10 syllables per line in iambic pentameter (alternating unstressed and stressed syllables), has been one the most persistent poetic forms used in modern European languages since the time of Francesco Petrarch (1304-1374), see [3]. Because sonnets are so short, poets have often grouped them into sequences which develop a train of thought across multiple sonnets. In writing the 14 sonnets of *Monna Innominata*, Rossetti intended to create “a sonnet of sonnets” – 14 14-line poems. In limiting his sequence to 13 sonnets, Grass deliberately falls one short of the expected 14 sonnets, perhaps in order to reflect his feeling that things have gone awry in modern Germany.

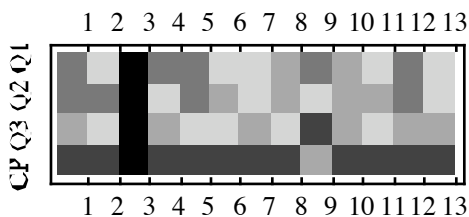


Figure 1: Number of Sonnet in Novemberland

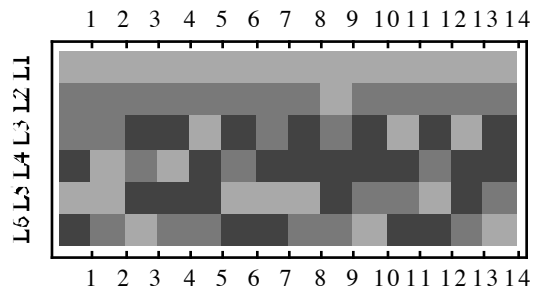


Figure 2: Number of Sonnet in Monna Innominata

Both Rossetti and Grass largely adhere to the Petrarchan sonnet pattern in which the 14 lines of the sonnets are organized into an 8-line *octave* usually end-rhymed *abbaabba* followed by a 6-line *sestet*, typically rhymed *cdecde*. In Grass’s case, the *sestet* can be thought of as a quatrain followed by a couplet. The transition between the octave and the *sestet*, called the *volta* or *turn*, is typically marked by some shift in the development of the sonnet’s ideas as well as a shift in the

end-rhyme sounds. Each poet utilizes variation within the general pattern of the Petrarchan sonnet as their sequences develop.

The end-rhyme patterns in Rossetti's *Monna Innominata* are quite consistent across all 14 sonnets, but there is significant variation in the end-rhyme patterns of the sestets. Therefore the analysis focuses on the sestets of the 14 sonnets line by line as shown in the gray-level bands of Figure 2. In contrast, visual analysis of end-rhyme patterns in Grass's *Novemberland* reveals significant variation for the three quatrains and the couplet as shown in Figure 1.

As the two figures above make immediately apparent, both sonnet sequences display marked variation in sonnet 9, just as an individual sonnet typically introduces some new feature at line 9. Surprisingly, Grass's third sonnet departs so significantly from the others in its rhyme pattern that its bar is left black. In this key sonnet Grass expresses his deep skepticism about the possibility that the world "rhymes" at all – that there is any pattern or meaning to be found.

There are other ways in which tools of mathematical visualization can support deeper and more nuanced representation of and analysis of poetry's counting structures. Although poetry is read, spoken and experienced in a linear, progressive manner, a graph-theoretical interpretation reveals structural cycles that can be represented as walks on strikingly simple polygonal directed graphs. For example, the graph for *Novemberland* (Figure 3) consists of side-by-side 3-, 4- and 5-cycles with the edges of the central 3-cycle representing pairs of sonnets with identical rhyme patterns and the graph for *Monna Innominata* (Figure 4) is dominated by two side-by-side 4-cycles. These graphs highlight where in the course of the sequence poets in effect retrace their steps.

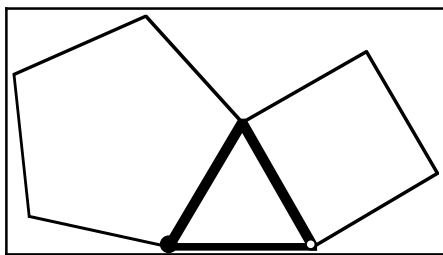


Figure 3: Rhyme Pattern Graph in Novemberland

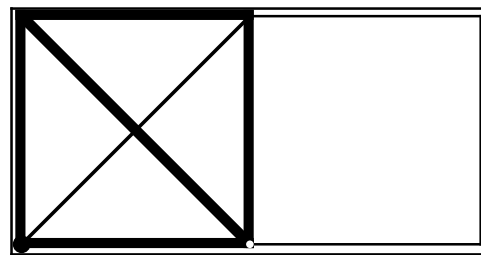


Figure 4: Rhyme Pattern Graph in Monna Innominata

More elaborate colored bands and numbered walks will be available on the website, see [4], along with rhyme annotations of Rossetti's sonnet sequence and samples from Grass's sonnets in accordance with copyright.

References

- [1] C. Rossetti, *Monna Innominata*, <http://classiclit.about.com/library/bl-etexts/crossetti/bl-crossetti-monna.htm>
- [2] G. Grass, *Novemberland: Selected Poems 1956-1993*, translated from the German by Michael Hamburger, New York: Harcourt, Brace, and Company, 1996.
- [3] M. R. G. Spiller, *The Development of the Sonnet: An Introduction*, New York: Routledge, 1992.
- [4] L. J. George and H. F. W. Höft, Mathematica notebooks, images and annotated sonnet texts, <http://people.emich.edu/hhoft/bridges2008/>