What Issues of Literary Analysis Can Differential Equations Clarify?

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ABSTRACT

The authors investigate to what extent differential equations can describe the dynamics of love relations in masochistic novellas. Unlike previous researchers, they base their analysis not only on psychological credibility. They relate their model to the ideas of literary criticism. The authors compare Ivan Turgenev’s Torrents of Spring with the most famous masochistic novella Venus in Furs by Leopold von Sacher-Masoch. To prove that the dynamics of masochistic relationships differ from that of the other types of romance they also investigate the plot of the undoubtedly non-masochistic story by Anton Chekhov “The Lady with the Dog.” Instruments of literary criticism coupled with mathematical modelling allow the authors to reproduce the temporal and spatial dynamics of love plots in fiction more precisely and clearly than it was done in previous research.

Keywords: Artistic Space, Chekhov, Love Dynamics, Masochistic Novella, Mathematical Modelling, Sacher-Masoch, Turgenev

INTRODUCTION

Mathematical modelling penetrated into literary criticism about half a century ago. Among various attempts to apply mathematics to the analysis of plots in fiction there is one, which appears to be most challenging. One type of plots has attracted mathematicians due to the emphasized dynamics of relations between characters. Such are love stories. Love/seduction plots are to be found in a great number of novels and tales. The difference between such plots in fiction and those in real life has been a key issue in literary theory since Aristotle. The structuring of love plots in fiction corresponds to the specific artistic strategy and philosophy of the writer.

Since the late 1980s, there have been several attempts to attain a scientific rather than scholarly-based objectivism to tackle issues, such as plot dynamics and plot structure. It is noteworthy that scholarship in this field put in the foreground love/seduction plots in fiction. Mathematical modelling of love affairs dates back to S. Strogatz’s article (Strogatz, 1988). His

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aim was to demonstrate the possibilities of modelling using systems of differential equations. The idea was developed in a set of further investigations and the love affairs or marriage plots in some novels and movies were modelled by means of systems of ordinary differential equations. In particular, love plots in *Gone with the Wind* (Rinaldi, Della Rossa, Landi, 2013), “Beauty and the Beast” (Rinaldi, Landi, Della Rossa, 2013), *Jules et Jim* (Dercle, 1999) were considered. The powerful machinery of dynamic systems was applied to research the interpersonal relations. Non-linear terms (Sprott, 2004) as well as stochastic interaction with the environment (Barley, Cherif, 2011) have enriched the picture of the possible dynamics of romantic relationships. A classification of love affair scenarios based on the theory of dynamic systems was proposed (Rinaldi, Della Rossa, Dercle, 2010). In all these studies, the choice of a specific form for the model was based upon the psychological veracity of the model, coefficients, etc. The estimation of the validity of a love scenario was made with reference to ‘common notions’ of love affairs.

In this study, the researchers will compare the models of the love affairs in two short novels (novellas). The first one: *Torrents of Spring* by the Russian 19th century writer Ivan Turgenev (Turgenev, 1872). The second is *Venus in Furs* by Leopold von Sacher-Masoch (Von Sacher-Masoch, 1869). The aim is to connect the models with the ideas and methods of literary criticism. It is worth mentioning here that the reconstruction of the love relation between Petrarch and Laura was performed (Jones, 1995). The reconstruction was based on the book of Petrarch’s love poems *Il Canzoniere*. A detailed stylistic and linguistic analysis (Jones, 1995) preceded the model investigation (Rinaldi, 1998). In this research, the authors cannot avoid taking into account the psychological features of the characters. However, they relate their model to literary theory rather than to psychology.

Turgenev’s *Torrents of Spring* can certainly be viewed as a masochistic novella. The protagonist, Dmitri Sanin, is typologically very close to the masochistic characters of Leopold von Sacher-Masoch. The comparison of Turgenev’s oeuvre to that of Sacher-Mazoch is the subject of several studies (Finke, 2000; Poluboyarinova, 2006). *Torrents of Spring* was published three years after Leopold von Sacher-Masoch’s story *Venus in Furs* had been completed. The latter text has been interpreted as a quintessence of masochism - perverse sensuality and eroticism. It is very unlikely that Turgenev ever read Sacher-Masoch’s text. Still less probable is the suggestion that he borrowed either ideas, or, imagery from *Venus in Furs*. Rather, researchers should suggest the reverse influence: it is known that in the early stage of his career Sacher-Masoch was infatuated with the works of his Russian colleague, who had already acquired fame in Europe, and positioned himself as an “Austrian Turgenev” (Poluboyarinova, 2006). The likeness of the two texts is typological. The biographies of both writers display their propensity to get involved in masochistic relations with dominating women (Poluboyarinova, 2006). The two novellas have much in common in their depiction of the protagonists and in the way in which the plots are constructed. The authors find it instrumental to build and compare the mathematical models of the love-affairs in these texts with the final intention to analyze the underlying similarity in the construction of masochistic narration. Such approach may work as a supplementary tool in the investigation of specific authorial intentions and complexes.

In order to underscore the specificity of the ‘masochistic models,’ the authors offer the example of “The Lady with the Dog” by Anton Chekhov. This story displays qualitatively different love dynamics.

In choosing a model to fit the love dynamics of masochistic narrations, the researchers bore in mind certain essential features of the characters. Still, constructing the adequate model of love dynamics correlating with their psychology, on the one hand, and bringing the model in correspondence with the composition of the text, on the other, is not a trivial task: the authors seek to solve this task in this paper.
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