

## Ivar Kull, a logician in Tartu semiotics (and on the mathematical side of Tartu semiotics of the 1960s)

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**Abstract.** In the early 1960s, literary scholars, linguists, and mathematicians shared an interest in semiotics as a field based on structural methods. This article highlights the role of mathematician Ivar Kull (1928–1989) in Tartu semiotics in the 1960s, and also serves as a commentary on the translation of Kull’s paper “Semiotics and teaching” that appears in this issue. Kull’s paper was first presented at the First Semiotics Summer School at Kääriku in 1964 and published as the opening article of the journal *Sign Systems Studies* in 1965.

**Keywords:** history of semiotics; mathematical semiotics; structuralism; Tartu School of Semiotics

The early 1960s witnessed an emerging interest in semiotics among several groups of intellectuals in Tartu – these were researchers of Russian literature (involving Juri Lotman and his colleagues), structural linguistics (Huno Rätsep and his students), and information theory and mathematical logic (Ivar Kull and Leo Võhandu). The work of Lotman’s group on semiotics was extensive and gained a strong following. Thus, it has attracted most attention in the existing accounts of the history of semiotics in Tartu, while the activities of other groups have been left out of the spotlight.

The importance of exact methods was understood as a necessary component in semiotic studies in Tartu in the 1960s. In the editorial to the second volume of *Sign Systems Studies* (1965), the editors state: “The shift of focus to the *meaning* of both an individual sign and the entire system, the desire to find ways to exact methods of studying content constitute a characteristic feature of the modern stage of semiotic studies”; and “[...] the *general scientific* importance of the still very modest attempts to develop exact methods for studying secondary modelling

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systems becomes obvious”.<sup>2</sup> As Juri Lotman (1972: 14) put it, “not only can art studies use the achievements of the exact sciences, they also provide impetus for the latter’s further development”.<sup>3</sup>

In 1967, an attempt was made to establish a semiotics laboratory at the University of Tartu. The correspondence between Juri Lotman and Boris Uspensky testifies that at that time Huno Rätsep and Juri Lotman were planning to found a joint semiotics laboratory with Lotman as the prospective director. The laboratory was envisioned to include three research teams in it – a team of culture or secondary modelling systems (led by Lotman), a linguistics team (led by Rätsep), and a mathematics team (led by Kull) – see Uspensky *et al.* (2016: 15–17, 92). The main research directions of this proposed centre for semiotics were described by Rätsep, Lotman and Kull in a daily newspaper (*Noorte Hääl*) in January 1967. The piece was titled “NB! Semiootika” (“NB! Semiotics”), and was accompanied by concise introduction of other researchers in the field as possible collaborators in the centre to be created, an article by Kull on semiotics (Kull 1967), as well as a brief account on local historical figures who had carried out work in general theory of sign systems – Jakob Linzbach, Eduard de Wahl, Jaan Sarv.

Rector of the University of Tartu Feodor Klement had been attempting to arrange collaboration between mathematicians and Lotman’s group already since 1961.<sup>4</sup> A potential area of research shared by mathematicians, linguists and literary scholars was the theory of machine translation. It is noteworthy that in May 1963 Juri Lotman gave a talk “On mathematical methods for studying literature” at the conference “Modern mathematics and its applications”, organized by the Estonian Naturalists’ Society in Tartu.<sup>5</sup> In the presentation, Lotman argued that structural-typological methods should be preferred to statistical methods.

Both Rätsep and Kull, as well as some of their colleagues, attended the first Tartu semiotics summer school held at Kääriku in 1964. Kull, who had also helped to organise the event,<sup>6</sup> participated with a talk (Kull 1964b), and later published

<sup>2</sup> “Ot redaktsii”, *Sign Systems Studies* 2: 6, 8 (1965): “Перенесение центра внимания на значение как отдельного знака, так и всей системы, стремление нащупать пути к точным методам изучения содержания составляют характерную черту современного этапа семиотических штудий”; “[...] становится очевидна общенаучная важность пока еще очень скромных попыток разработать точные методы изучения вторичных моделирующих систем”. See also Salupere 2011.

<sup>3</sup> “[...] искусствознание может не только использовать достижения точных наук, но и само давать импульсы для их дальнейшего развития”.

<sup>4</sup> From an interview with Leo Võhandu (Kull, Velmezova 2017a: 176–177).

<sup>5</sup> Lotman 1963. Mentioned also in a conference review by Kull and Tiit (1963).

<sup>6</sup> In an Estonian-language letter from Ivar Kull to Juri Lotman, dated 24 July 1964, Kull informs Lotman about some conditions for the summer school that was scheduled to begin on

a review of the summer school (Kull 1964c). In the latter, notably, he used the term ‘extralinguistic modelling systems’ as a synonym for ‘secondary modelling systems’ – the formulation used also by Lotman in his introductory words to the meeting (Lotman 1964: 3: “The decision to dedicate this meeting to extralinguistic issues of semiotics [...]”).

The creation of a semiotics laboratory was not successful,<sup>7</sup> but both Rätsep and Kull remained members of the editorial board of *Sign Systems Studies* for a long time.<sup>8</sup> Indeed, launching of the journal was a joint effort and it had been jointly designed to start with. As the editors wrote in the preface of the first issue, the journal was “designed to unite the efforts of literary scholars, linguists, and mathematicians to solve joint problems”.<sup>9</sup>

In the early years of the Tartu-Moscow School of Semiotics, mathematicians played a notable role. Vladimir Uspensky, who participated in the first Kääriku Summer School and also gave lectures in Tartu, had a significant influence on the ideas of the school. There was also an impact from Andrei Kolmogorov through his four long messages, sent by him in the period from April 1961 to December 1964 to a collective addressee consisting of Vyacheslav Vs. Ivanov, Mihail K. Polivanov and Vladimir A. Uspensky, in which Kolmogorov discussed semiotics of art and literature from a cybernetic point of view (see Uspensky 2002).

The present issue of *Sign Systems Studies* contains a translation of an article by Kull, that was first published in this journal in 1965. The first volume of *Sign Systems Studies* (1964) consisted of a monograph by Juri Lotman, but from the second volume onwards the journal’s issues comprise collections of articles. Thus, the journal’s opening article was Kull’s “Semiotics and teaching”, followed by articles by Juri Lotman, Aleksandr Pyatigorski, and many others.

Ivar Kull (1928–1989) graduated from the University of Tartu as a mathematician in 1953, and received his PhD in mathematics from the same university in 1958. In 1959, when the University of Tartu’s Computing Centre was established, Kull became its first director (1959–1962).<sup>10</sup> Until the end of his life, Kull worked at

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19 August. He also suggested that his colleague, mathematician Reedik Palm (1933–1974) be invited to the summer school (Tartu University Library archive, F 135, s. Bk721).

<sup>7</sup> It was only in 1983 that the Laboratory of History and Semiotics was established, then in collaboration with Linnart Mäll and Herbert Ligi. The Department of Semiotics of the University of Tartu was established in 1992.

<sup>8</sup> Ivar Kull was a member of the editorial board of *Sign Systems Studies* from 1964 to 1983 (vols. 1–3, 5–16), as was Huno Rätsep (from 1964 to 1986, vols. 1–19). One more Estonian member of the editorial board beyond Lotman’s group was philosopher Lembit Valt (from 1964 to 1973, vols. 1–6).

<sup>9</sup> “*Ot redaktsii* [From the editors]”, *Sign Systems Studies* 1: 4 (1964).

<sup>10</sup> Initially, the Computing Centre was located in the same building (next to the main building of the university) as was Lotman’s group.

the University's Institute of Mathematical Statistics and Programming, teaching courses on mathematical logic and programming. He published a textbook on mathematical logic that was widely used in Estonia (Kull 1964a).



*Photo.* Ivar Kull in early 1980s. (Family archive.)

Already in the early 1960s, before Juri Lotman became interested in semiotics, Huno Rätsep taught structural linguistics and the theory of Ferdinand de Saussure. In 1965–1972, a linguistics seminar of Huno Rätsep, called the Group of Generative Grammar (GGG), was active in Tartu and united a group of talented

young linguists. As Mati Hint, one of its members, has said in an interview,<sup>11</sup> the GGG was born from the enthusiasm of three young men: the linguist Huno Rätsep (1927–1926), the computational mathematician Ülo Kaasik (1926–2017), and the mathematical logician Ivar Kull. Besides interdisciplinary seminars on theory of language, the GGG organized an international conference in Tartu in 1967, which was attended by several semioticians and mathematicians as well.

Ivar Kull's talk at the semiotics summer school in Kääriku in August 1964 was titled "Analysis of teaching methods from a semiotic perspective" (Kull 1964b). In addition to its publication in *Sign Systems Studies* (Kull 1965a), a version of the paper also appeared in Estonian (Kull 1965b) and Kull presented on closely related topics also at conferences in Riga (Kull 1965c) and in Moscow (Kull 1966).

Besides "Semiotics and teaching",<sup>12</sup> Kull also published an article on the logical construction of tetralemmas in Buddhist texts in *Sign Systems Studies* together with orientalist Linnart Mäll (Kull, Mäll 1967), and evoked semiotic aspects in a paper about models in the educational process (Kull 1966: 13f).

Not many of Kull's publications explicitly deal with semiotic problems. However, in the 1970s he supervised the research project "Development of decision-making algorithms in semiotic models and methods for examining operators".<sup>13</sup> Kull also supervised some student works on semiotics, among them Tõnu Veiderpass' diploma thesis ("Jakob Linzbach and his work *Principles of a philosophical language*", 1972), and Raivo Ruus' diploma thesis ("Semiotic analysis of collective decision-making process", 1976). Together with students, he studied and modelled actors' communication in theatrical performances.

Kull had broad interests in the field of philosophy of mathematics. Among other things, he was interested in modelling complex systems. He was one of the founders of the publication series *Mathematical Psychology* in Tartu (see Kull 1974). He was also interested in catastrophe theory<sup>14</sup> and synergetics.<sup>15</sup>

<sup>11</sup> See Kull, Velmezova 2017b: 167.

<sup>12</sup> It should be mentioned that the word 'обучение' in the title of the Russian version (Kull 1965a) as well as the word 'õppeprotsess' in the Estonian version of the article (Kull 1965b) cover both teaching and learning. Juri Lotman would later use the same term (see Lotman 1971).

<sup>13</sup> *Разработка алгоритмов принятия решения в семиотических моделях и методики обследования операторов (заключ. отчет):* Б 548592 : Ш 75055 (А-5031) : ГР 75022358 / (ТГУ, кафедра мат. статистики); руководитель Куль, И. Г. Тарту, 1976.

<sup>14</sup> See Mürsepp 2018: 80, 82.

<sup>15</sup> Personal information from a conversation with Kalevi Kull in 1980s. Incidentally, the surnames of Ivar Kull and Kalevi Kull do not have the same origin.

It can be assumed that the broad scientific approach to semiotics in the Tartu tradition has been influenced by this early period, when, alongside literary scholars, Estonian linguists and mathematicians also dealt with semiotics.

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## References

- Kull, Ivar; Tiit, Ene 1963. Konverents Kaasasegne matemaatika ja tema rakendused [Conference Modern mathematics and its applications]. *Matemaatika ja Kaasaeg* 1: 71–74.
- Kull, Ivar 1964a. *Matemaatiline loogika* [Mathematical logic]. Tallinn: Eesti Riiklik Kirjastus.
- Kull, Ivar 1964b. Analiz sposobov obucheniya s točki zreniya semiotiki. [Analysis of teaching methods from a semiotic perspective.] In: Lotman, Juri (ed.), *Programma i tezis dokladov v letnej shkole po vtorichnym modeliruyushchim sistemam 19–29 avgusta 1964 g.* Tartu: Tartu Riiklik Ülikool, 33–34. [Анализ способов обучения с точки зрения семиотики. In: Лотман, Юрий (ред.), *Программа и тезисы докладов в летней школе по вторичным моделирующим системам 19–29 августа 1964 г.* Тарту: Тартуский государственный университет, 33–34.]
- Kull, Ivar 1964c. Ekstralingvistiliste süsteemide modelleerimise alane seminar Käärikul [Seminar on extralinguistic modeling systems in Kääriku.] *Matemaatika ja Kaasaeg* 4: 93–94.
- Kull, Ivar 1965a. Semiotika i obuchenie. [Semiotics and teaching.] *Sign Systems Studies* 2: 11–21. [Семиотика и обучение. *Труды по знаковым системам* 2: 11–21.]
- Kull, Ivar 1965b. Semiootika ja õppeprotsess. [Semiotics and learning process.] *Matemaatika ja Kaasaeg* 8: 34–42.
- Kull, Ivar 1965c. Semioticheskiy analiz protsessa obucheniya. [Semiotic analysis of the learning process.] In: *I resp. konferentsiya po programmirovannomu obucheniyu i primeneniyu tehnikeskikh sredstv v uchebnoy protsesse. (Tezisy dokladov).* Riga, 29. [Куль, И. Г. 1965. Семиотический анализ процесса обучения. In: *I респ. конференция по программированному обучению и применению технических средств в учебном процессе. (Тезисы докладов).* Рига, 29. (Напеч. на ротаторе.)]
- Kull, Ivar 1966. *Modeli v uchebnoy protsesse: Material k Vsesoyuznoy konferentsii po programmirovannomu obucheniyu i primeneniyu tehnikeskikh sredstv v uchebnoy protsesse (fevral' 1966 g.).* [Models in the educational process: Material for the All-Union conference on programmed learning and the use of technical means in the educational process (February 1966).] Tartu: TRÜ rotaprint. [Куль, Ивар 1966. Модели в учебном процессе: Материал к Всесоюзной конференции по программированному обучению и применению технических средств в учебном процессе (февраль 1966 г.). Тарту: Ротап rint ТГУ.]

- Kull, Ivar 1967. Mudelid ja märgiteooria. Mis on semiootika? Ekskurss 1500 keele maailma [Models and sign theory. What is semiotics? An excursion into the world of 1500 languages]. *Noorte Hää* 17 January, 2.
- Kull, Ivar 1974. O nekotom klasse psihometricheskikh modelej. [On a class of psychometric models.] In: Kull, Ivar (ed.), *Matematicheskaya psihologiya I.* (Acta et Commentationes Universitatis Tartuensis 337.) Tartu: University of Tartu Press, 29–46. [Куль, И. Г. 1974. О некотором классе психометрических моделей. In: Куль, И. (ed.), *Математическая психология I.* (Ученые записки Тартуского государственного университета 337.) Тарту: Тартуский государственный университет, 29–46.]
- Kull, Ivar; Mäll, Linnart 1967. K probleme tetralemmy. [On the problem of tetralemma.] *Sign Systems Studies* 3: 60–63. [Куль, И.; Мяль, Л. 1967. К проблеме тетралеммы. *Труды по знаковым системам* 3: 60–63.]
- Kull, Kalevi; Velmezova, Ekaterina 2017a. Leo Vöhandu: informaatika seostest semiootikaga. [Leo Vöhandu: on the relationships between informatics and semiotics.] *Acta Semiotica Estica* 14: 166–183.
- Kull, Kalevi; Velmezova, Ekaterina 2017b. “Ma ei saa kunagi aru, miks ma pean Tartust ära sõitma, kui ma seal olen”: Mati Hindiga eesti keelest, semiootikast ja Tartust. [“I never understand why I have to leave Tartu when I’m there”: with Mati Hint on Estonian language, semiotics and Tartu.] *Acta Semiotica Estica* 14: 165–175.
- Lotman, Juri 1963. Kirjanduse uurimise matemaatilistest meetoditest. [On mathematical methods for studying literature.] In: *Teaduslik konverents “Kaasaegne matemaatika ja tema rakendusala”: 3.–5. maini 1963.* Tartu: Tartu Riiklik Ülikool, 65.
- Lotman, Juri 1964. Vstupitel’noe slovo. [Introductory words.] In: Lotman, Juri (ed.), *Programma i tezisyy dokladov v letnej shkole po vtorichnym modeliruyushchim sistemam 19 – 29 avgusta 1964 g.* Tartu: Tartu Riiklik Ülikool, 3–5. [Лотман, Юрий 1964. Вступительное слово. In: Лотман, Юрий (ред.), *Программа и тезисы докладов в летней школе по вторичным моделирующим системам 19–29 августа 1964 г.* Тарту: Тартуский государственный университет, 3–5.]
- Lotman, Juri 1971. Problema “obucheniya kul’ture” kak ee tipologicheskaya harakteristika. [The problem of “teaching of culture” as its typological characterization.] *Sign Systems Studies* 5: 167–176. [Лотман, Юрий 1971. Проблема “обучения культуре” как ее типологическая характеристика. *Труды по знаковым системам* 5: 167–176.]
- Lotman, Juri 1972. Iskusstvoznaniye i “tochnye metody” v sovremennykh zarubezhnykh issledovaniyakh (vstupitel’naya stat’ya). [Art studies and “exact methods” in contemporary foreign research (introductory article).] In: Lotman, Juri; Petrov, Vladimir (eds.), *Semiotika i iskusstvometriya.* (Sovremennyye zarubezhnyye issledovaniya.) Moscow: Mir, 5–23. [Лотман, Юрий 1972. Искусствознание и “точные методы” в современных зарубежных исследованиях (вступительная статья).] In: Лотман, Ю. М.; Петров, В. М. (ред.), *Семиотика и искусствометрия.* (Современные зарубежные исследования.) Москва: Мир, 5–23.
- Müürsepp, Peeter 2018. Katastroofiteooria matemaatikas – meenutuskilde retseptisioonist Eestis. [Memoirs of the reception of catastrophe theory in mathematics in Estonia.] *Tartu Ülikooli ajaloo küsimusi* 46: 78–88.
- Salupere, Silvi 2011. Semiotics as science. *Sign Systems Studies* 39(2/4): 271–289.

- Uspensky, Boris; Kelbert Olga; Trunin, Mihhail (eds.) 2016. *Yu. M. Lotman – B. A. Uspensky: Perepiska 1964–1993*. (Bibliotheca Lotmaniana.) Tallinn: TLU kirjastus. [Успенский, Борис; Келберт, Ольга; Трунин, Михаил (ред.) 2016. *Ю. М. Лотман – Б. А. Успенский: Переписка 1964–1993*. (Bibliotheca Lotmaniana.) Таллин: Издательство ТЛУ.]
- Uspensky, Vladimir 2002. *Trudy po nematematike. S prilozheniem semioticheskikh poslanij A. N. Kolmogorova k avtoru i ego друз'ям. 2 t.* [Works on non-mathematics. With an appendix of A. N. Kolmogorov's semiotic messages to the author and his friends. 2 vols.] Moscow: OGI. [Успенский, В. А. 2002. *Труды по нематематике. С приложением семиотических посланий А. Н. Колмогорова к автору и его друзьям. 2 т.* Москва: ОГИ.]