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**CHRONOLOGICAL DISTRIBUTION OF THE BULGARIAN
MEDIAEVAL MANUSCRIPTS PRESERVED IN BULGARIA***

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We present in this paper an investigation on the chronological distribution of extant Bulgarian mediaeval manuscripts, suggesting a new function. We call the function “Chronological distribution of manuscripts”. The idea, which we exploit, is similar to the idea of the “volume function”, introduced by A. Fomenko in [1], developed and applied by A. Fomenko, S. Rachev and V. Kalashnikov in [2], [3] and [4], and generalized by J. Tabov in [5]. J. Tabov, K. Vasilev and A. Velchev [6] recently used similar construction in their research on coin finds in Bulgaria. Based on the visual representation of the chronological distribution of the extant Bulgarian manuscripts, we deduce some hypothesis and open problems.

1. Introduction. There are numerous Bulgarian manuscripts, written centuries ago, which have survived and are being kept currently in different collections (basically in libraries, museums and monasteries). They were created during different periods in the past.

How does their quantity vary from one period to another? Which is the period in our past from which the greatest number of manuscripts survived?

It is not easy to give a precise answer to such questions. In our paper we try to bring some light using quantitative data on the Bulgarian manuscripts, being stored in our national repositories.

We suggest a method for constructing *appropriate function of the chronological distribution* of the extant Bulgarian manuscripts. Its graph, obtained by standard computer software tools (Microsoft Excel), provides a good visual presentation of the function.

The method follows the ideas of the *volume function* introduced by A. Fomenko in [1] and applied by A. Fomenko, V. Kalashnikov and S. Rachev in [2], [3] and [4]. It is also similar to function *chronological distribution of information in historical texts*, introduced by J. Tabov in [5] and *function of monetary volume*, introduced by Tabov, Vasilev and Velchev in [6].

Our basic data source is the catalogue “Bulgarian manuscripts from 11th to 18th century, preserved in Bulgaria” [7].

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Key words: mediaeval manuscript, volume function, chronological distribution.

2. Description of the method.

2.1. Chronological distribution of manuscripts. We consider decades as smallest basic time units. For every manuscript we define *Individual Unit-step Function (IUF)* as follows:

$$f(t) = \begin{cases} 60/n, & \text{if } t \in [X_1; X_2] \\ 0, & \text{if } t \notin [X_1; X_2] \end{cases}$$

where:

$[X_1; X_2]$ is the period of writing of the respective manuscript;

t is not a particular year but a decade;

n is the number of decades (“length”) in the period $[X_1; X_2]$.

We round periods like 1331–1343 (in this case we use 1330–1339). For example the Enina apostle is dated to the middle of the 11th century. Therefore we refer it to the 1040–1049, 1050–1059, 1060–1069 decades and $n = 3$. Thus the IUF of each manuscript “cuts” from the first quadrant of the co-ordinate system a rectangle of area 60. The number 60 is chosen for the sake of convenience, since it is divisible by 2, 3, 4, 5, 6, 10, 12, 15, 20 and 30, which leads to integer values for f .

Summing up IUF of all the studied manuscripts, we obtain the values of their total contribution to all the decades in the particular period, as needed. We call the sum of all IUF **Chronological Distribution of Manuscripts (CDM)**. The function obtained by the described method is a mathematical model of *the chronological distribution of the studied Bulgarian mediaeval manuscripts*.

A basic parameter, on which depends the accuracy of our conclusions, is the quantity of the manuscripts we study. Our investigation is based on 820 of all extant and catalogued Bulgarian manuscripts, and therefore our results and conclusions are reliable.

2.2. Practical implementation. We create in Excel a table with 87 columns, the first of which corresponds to 1040–1049 decade, second – to 1050–1059 decade and so on. The explored period is 11th–19th centuries. The number of rows (820) is equal to the number of manuscripts we enter, because every manuscript is allocated a row in the table. We enter in the cells the values of IUF for the respective decades. Summing up the column elements we obtain the values of CDM. Excel is able to perform the last operation automatically. Consider that we have created a table of all extant manuscripts and a new manuscript is discovered. We already have our table and just add a new row with the IUF values corresponding to its dating. Thus CDM is updated easily. Proceeding this way we enter all the data in the spreadsheet.

2.3. Graph constructing of CDM. When the table is finished, the last row contains the values of CDM. We insert a new row above it, where we enter in the cells the decades between 1040–1900. Then we construct automatically a graph based on the values in the table. In our case it can be seen in Figure 1.

3. Analyses and hypotheses. A growth can be observed on the graph after 1200. It was probably caused by the liberation of Bulgaria from Byzantine rule. Another possible explanation is that the survived manuscripts from the period before 1200 are very scarce because they are too old. It is obvious that the whole graph is “sloped” from left to right. Its height is a growing function of time as a global tendency.

In the sub-period 1350–1400 there is a local peak, probably caused by the activities of the Kilifarevo and the Turnovo literary schools (KTLS). The peak is in the decade

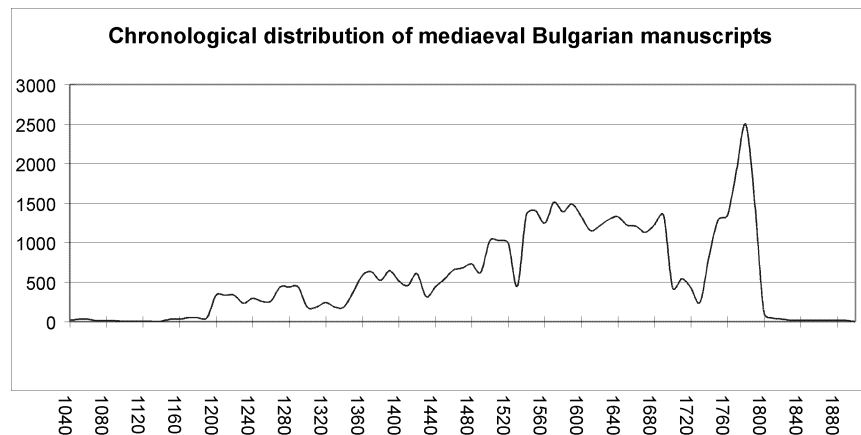


Fig. 1. The graph of the Chronological Distribution of the extant Bulgarian Manuscripts.

1380-1389. The period 1390–1430 is marked by decrease, which could be explained with the Turkish invasion and conquest of Bulgaria. The CDM reaches a local minimum at 1420-1430. This is probably due to the extermination of the KTLS. The growth after 1440 and the high values of CDM up to 1700 could be explained with the establishment of the Sofia literary school. In particular,

1. During the 17th and 18th centuries Kremikovski Monastery was an important literary centre, which supported the neighbouring monasteries like Seslavsky and Eleshnishki. Seslavsky Monastery. “Saint Nikola” existed since the first centuries of the Turkish slavery, but it was later destroyed.
2. Tetraevangelia (Four Gospels) with marginal notes dated 1577, 1718 and 1730 year are also preserved; Psalter from 16th century, Mineion and Oktoich from 1702 year, which testify that intensive literary activities were performed in the Eleshnishki Monastery.
3. The Alinski Monastery is among those, which during the early Resurrection became local literary centres. A Feast Mineion with 668 pages, dated 15th–16th centuries is preserved in Alino village. The Alinski Monastery possessed several buildings and other properties, which later were destroyed by the Turks.
4. The Koklianski Monastery “Saint Archangel Michael” was a literary centre during the 16th century. A Gospel dated this century survived. There is the origin of the famous Urvichki miscellany, dated 15th century, containing names listed between 1645 and 1742 to be mentioned during the liturgies.
5. Gospels, Psalters and other church books were hand-copied in the cells of the Dragalevski Monastery “Holy Virgin Mary of Vitosha”. A Tetraevangelion dated 1469, was copied by the priest Nikola. A copy of another Tetraevangelion was made

in 1534. The monastery was a literary centre of the Sofia literary school. There was a Monastery school during the 17th century.

6. Saint Pimen Zographsky, born c. 1540 who died after 1618, contributed to the “Explosion of church creating” in the last decade of 16th and the first decades of 17th centuries. At this time the famous Varovitecka literary school in the Etropolsky Monastery was prospering.

Other period of high values of FMV is the whole 18th century but first quarter. This can easily be explained with the period of the Bulgarian Resurrection.

A regular decrease can be seen on the graph after 1790. It is probably due to the book printing, which replaced hand-copying in our lands later than in the rest of Europe.

4. Open questions.

4.1. Let us note that the whole graph is “sloped” from left to right. As a global tendency, its height is a growing function of time. But is this growth linear, or polynomial, or exponential?

4.2. It is clear from Figure 1, that there is a considerable decline of the CDM values in the beginning of the 18th century and low values during the first half of the 18th century. We do not have a good explanation of this fact.

The above analysis and questions show some general applications of the CDM: to rise problems and hypotheses, to give arguments *pro* and *contra*. We cannot expect proofs; all conclusions obtained formally from the graph of CDM require further investigations and additional arguments.

We are planning to continue this research adding data on other literary traditions, and on Bulgarian manuscripts which are preserved abroad.

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ХРОНОЛОГИЧНО РАЗПРЕДЕЛЕНИЕ НА ОЦЕЛЕЛИТЕ СРЕДНОВЕКОВНИ БЪЛГАРСКИ РЪКОПИСИ

**Йордан Б. Табов, Милена П. Добрева, Асен П. Велчев,
Калина С. Сотирова**

В настоящия доклад представяме изследване на хронологичното разпределение на оцелелите средновековни Български ръкописи, запазени в България. Предлагаме нова функция „хронологично разпределение на ръкописи“. Методите, които използваме за конструирането и, са подобни на онези, отнасящи се до функциите за обем, въведени от А. Фоменко и С. Рачев при проучване на исторически текстове. Доколкото ни е известно такива методи не са прилагани при изучаване на ръкописи. Й. Табов, Кл. Василев и А. Велчев са ги прилагали към изучаване на нумизматика. Й. Табов също ги е прилагал за изучаване на исторически текстове. Тук издигаме хипотези и поставяме въпроси, на които засега не можем да дадем отговор.