Á. Elbert and B. M. Garay, Differential equations: Hungary, the extended first half of the 20th century, In: *A Panorama of Hungarian Mathematics in the Twentieth Century I.*, Springer, Berlin, 2005, pp. 245–294.

Ez a dolgozat Egerváry következő differenciálegyenletek tárgyú munkáit említi:

[EJ1] E. Egerváry, *On a class of integral equations*, Math. Phys. Lapok **23** (1913), 301–355. (in Hungarian)

[EJ2] E. Egerváry, *Begrundung und Darstellung einer allgemeinen Theorie der Hangebrucken mit Hilfe der Matrizenrechnung*, Abhandlungen der Internationalen Vereinigung fur Bruckenbau und Hochbau **16** (1956), 149–184.

[ET1] E. Egerváry and P. Turán, *On a certain point of the kinetic theory of gases*, Studia Math. **12** (1951), 170–180.

[ET2] E. Egerváry and P. Turán, *On some problems in the kinetic theory of gases*, MTA Mat Fiz. Oszt. Közl. **1** (1951), 303–314. (in Hungarian)

Utalás történik továbbá Egerváry két közvetlen munkatársának alábbi cikkére is:

[KS1] D. Kőnig and A. Szűcs, *Mouvement d'un point abandonn'e 'a l'int'erieur d'un cube*, Palermo Rend. **36** (1913), 79–90.

Elbert és Garay így mutatják be Egerváry differenciálegyenletek témájú munkásságát:

THE WORK OF EGERVÁRY. The first result obtained in the post–war period in Hungary we present is due to Jenő Egerváry and Pál Turán [ET1] and devoted to the memory of D. König and A. Szücs who could not survive the tragic days of 1944/45. Combined with hard analytic tools which go back to H. Weyl, Egerváry and Turán used the geometric ideas of D. König and A. Szűcs [KS1] in proving a weak, somewhat artificial form of the Boltzmannian Hypothesis in the kinetic theory of gases. They considered an oversimplified differential equation model (which is very carefully chosen but not a differential equation model any more — nevertheless, we feel that the differential equation chapter is a right place discussing it) of n particles: the n particles are included in an immobile cube $C = \{(x_1, x_2, x_3) \,|\, 0 \le x_1, x_2, x_3 \le \pi\}$, they are dimensionless, of equal mass, no attractive or exterior forces acting, the impacts on the walls according to the laws of elastic reflection, collisions between three or more particles excluded, collisions between two particles according to the law of elastic impact, the initial conditions of the n particles at time $t_0 = 0$ are arbitrary and, with $\vartheta_1 = 1$, $\vartheta_2 = 2^{1/2}$, $\vartheta_3 = 3^{1/2}$, the initial velocities satisfy

$$v_k^i \in n^{2/5}(1+\frac{k}{n^{101/100}})\cdot\left(\vartheta_i - \frac{1}{n^{10}}, \vartheta_i + \frac{1}{n^{10}}\right) \quad i = 1,2,3 \text{ and } k = 1,2,\ldots,n\,.$$

For simplicity, Egerváry and Turán say that the n particles are *equidistributed* at time t if for any rectangular body R in C, the number of particles $N(R,t)$ in R at t satisfies

$$\left|\frac{N(R,t)}{n} - \frac{\text{vol}(R)}{\pi^3}\right| \le \frac{1}{n^{1/10}}\,.$$

They prove that the particles are equidistributed for the time interval $0 \le t \le n^{1/4}$ except time intervals whose total length does not exceed $c_0 n^{-1/10}\log^4 n$ where c_0 stands for a moderate numerical constant. If n is of the order 10^{23}, then $n^{1/4}$ is about several days, and $c_0 n^{-1/10}\log^4 n$ is about several seconds long. Estimates which are slightly better and work for more realistic initial velocities can be found in [ET2] which is a technically improved version of [ET1]. In both papers, the intention of the authors is to support the opinion that (some reasonable variant of) the Boltzmannian hypothesis can be derived as a consequence of the basic laws of mechanics.

Jenő Egerváry, a professor at the Budapest University of Technology, is one of the very few Hungarian mathematicians whose entire career is closely related to applied mathematics. Starting from his 1913 PhD Thesis (dedicated to a single linear Fredholm integral equation [EJ1]) to his latest results (including his 1956 paper on a large system of fourth–order linear differential equations modelling suspension bridges [EJ2]) he wrote several articles on the convergence of the method of finite differences. He had papers on the three–body problem, on heat conduction, and on the motion of the electron as well.