Euler Archive Spotlight: Ed Sandifer's Influence

Erik Tou
University of Washington – Tacoma, etou@uw.edu

Euler Archive Spotlight

Erik R. Tou, University of Washington Tacoma
1900 Commerce St., Tacoma, WA 98402
etou@uw.edu

Welcome back to the Euler Archive spotlight! For this special issue, *In Honor of C. Edward Sandifer*, I thought it appropriate to use this column to reflect on Ed Sandifer's influence on the Euler Archive.

The story begins in October 2001, when Ed presented at the Dartmouth College Mathematics Colloquium on the subject of "Some of Euler's Early Infinite Series." Infinite series were a longtime interest of Ed's, and a frequent topic of his *How Euler Did It* [4] column published online by the MAA from 2003 to 2010.[a] This particular presentation focused on Euler's solution to the Basel problem,

$$1 + \frac{1}{4} + \frac{1}{9} + \frac{1}{16} + \cdots \ = \ \frac{\pi^2}{6},$$

along with the Euler product formula

$$\sum_{n=1}^{\infty} \frac{1}{n^s} \ = \ \prod_{p \text{ prime}} \left(1 - \frac{1}{p^s}\right)^{-1}$$

both of which are well-known today as properties of the Riemann ζ-function. Ed's particular contribution was to link these formulae to Euler's early-career paper "De progressionibus transcendentibus seu quarum termini generales algebraice dari nequeunt" (E19, "On transcendental progressions, that is, those whose general terms cannot be given algebraically") [3], written in 1730, and his first letter to Christian Goldbach in 1729. This and more can be found in the chapter "Some Facets of Euler's Work on Series" that Ed wrote for the volume *Leonhard Euler: Life, Work and Legacy* [1], which he edited with Robert Bradley.

In 2001, though, this work was some years in the future. The important observation in our story is that this presentation connected Ed to Dominic Klyve and Lee Stemkoski, who attended the first meeting of the Euler Society in Rumford, Maine in 2002. At that meeting, the idea of an online archive was conceived. Now a commonplace feature of the Internet, in 2002 the technology

---

[a]Ed later developed this column into a pair of books, *How Euler Did It* [5] and *How Euler Did Even More* [6], both available from the AMS Bookstore at https://bookstore.ams.org/.

was only beginning to catch up with the aspirations of scholars — Dartmouth College happened to possess the means of scanning to PDF along with the broad reach of the interlibrary loan system of the Ivy League.

Along with fellow students Rachel Esselstein, Alison Setyadi, and the author, Dominic and Lee began the process of documenting, obtaining, and scanning all the works of Euler that were available to them. In 2003, the Euler Archive was born. By the time Ed returned to speak for the Dartmouth Mathematics Colloquium in April 2004[b], the Archive included scans of 518 of Euler's works (about 60% of those enumerated in Gustav Eneström's index [2]). By 2006, that number had reached 90%. Today, that number is 97%, with an additional 2% available in digital archives around the world.

Ed was instrumental in supporting the rapid growth of the archive. To begin with, it was his spreadsheet that formed the core of the Euler Archive's records. During the years leading up to 2003, Ed had methodically listed all of the works from Eneström's index, provided English translations for many of the titles, and written a number of summaries of their contents. In fact, most of the Latin-to-English title translations (and many of the summaries) on the Euler Archive today were written by Ed. He generously provided his records to the Euler Archive, and it was from this core that we expanded to include nearly all of Euler's works, many translations and summaries, and *Euleriana* itself.

While Ed Sandifer's death in 2022 was a great loss to the community of Euler scholars, his legacy includes numerous historians of mathematics: their work and enthusiasm will continue for many years to come. That legacy also includes the Euler Archive itself. Without Ed's own enthusiasm and support for this project, it would not exist today.

References

[1] Bradley, R. E., and Sandifer, C. E. (eds.). (2007). *Leonhard Euler: Life, Work and Legacy*, 1st ed. Elsevier.

[2] Eneström, G. (1910-1913). "Die Schriften Eulers chronologische nach den Jahren geordnet, in denen sie verfasst worden sind." *Jahresber. Dtsch. Math.-Ver.* 4: pp. 1-388.

[3] Euler, L. (1738). "De progressionibus transcendentibus seu quarum termini generales algebraice dari nequeunt." *Commentarii academiae*

---

[b]This time, his topic was Jurij Vega's use of Euler's work to calculate π to 140 decimal places.

scientiarum Petropolitanae 5: pp. 36-57. Available online at https://scholarlycommons.pacific.edu/euler-works/19/.

[4] Sandifer, C. E. (2003-2010). *How Euler Did It*, MAA Online. Available online at http://eulerarchive.maa.org/hedi/.

[5] Sandifer, C. E. (2007). *How Euler Did It*. The Mathematical Association of America.

[6] Sandifer, C. E. (2015). *How Euler Did Even More*. The Mathematical Association of America.