

# BO1.1. History of Mathematics

Sheet 0 — HT25

## Reading Course: The Introduction of Differential Notation into Britain. Christmas Vacation Reading

### Outline

This year's reading course will examine the way in which differential notation — and therefore Leibnizian calculus — found its way into Britain during the early decades of the nineteenth century, and thus how the traditionally geometrically conceived calculus inherited from Newton gave way to the more algebraic methods of continental analysis. By way of context, we will begin by examining criticisms of the state of mathematics in Britain, focusing in particular on the 1808 review by John Playfair (1748–1819) of Pierre-Simon Laplace's *Traité de mécanique céleste* (eventually 5 volumes, 1799–1825), which lamented the general inability of mathematicians in Britain to read this work. Although Playfair's concerns were legitimate, the situation was not quite so bleak as he had indicated, for the Cambridge mathematician and astronomer Robert Woodhouse (1773–1827) had already made an attempt to introduce the differential notation into Britain in his 1803 text *The Principles of Analytical Calculation*, which we will read in some detail and try to make an assessment as to its impact.

Woodhouse aside, there were two main routes via which the Leibnizian calculus was finding its way into British mathematics by about 1820: through its use in the solutions of problems set in the mathematical question-and-answer journals that were published at this time, and through the advocacy and publications of the Cambridge-based Analytical Society, whose members included Charles Babbage (1791–1871), John Herschel (1792–1871), and George Peacock (1791–1858). With regard to question-and-answer journals, we will focus our attention on the *The New Series of the Mathematical Repository*, which was edited by Thomas Leybourne (c.1769–1840) between 1806 and 1835. We will examine in particular the solutions submitted by William Wallace (1768–1843) and Mary Somerville (1780–1872) that appear in volume 4 (1819) of the journal. In connection with the Analytical Society, we will read portions of their English translation of Sylvestre-François Lacroix's 1802 *Traité élémentaire de calcul différentiel et de calcul intégral*, namely *An Elementary Treatise on the Differential and Integral Calculus* (1816).

### Vacation reading

As preparation for the reading course, please review the MT material on the history of calculus and analysis, and revisit the relevant sections of Katz. You should look in particular at material pertaining to the divide between British and continental European attitudes towards calculus. In addition, please do some biographical reading on the people mentioned above. A source of reliable biographies is the *Oxford Dictionary National Biography*, which you can access via SOLO. Feel free also to make use of MacTutor, but make sure to follow up some of the references given.

## Exercise 1

The details of the main texts that we will use during the reading course are given below (additional sources, both primary and secondary, will be recommended in HT). Ahead of our first class, please make sure that you have access to them — they are all available online, mostly via SOLO, but you might also like to try <http://www.proquest.com>. If you have any difficulties, please let me know.

- John Playfair, 'Traité de Méchanique Céleste. Par P. S. La Place', *Edinburgh Review* 11(22) (1808), 249–284
- Robert Woodhouse, *The Principles of Analytical Calculation*, Cambridge, 1803
- Thomas Leybourn (ed.), *The New Series of the Mathematical Repository*, vol. 4, London, 1819
- Sylvestre-François Lacroix, *An Elementary Treatise on the Differential and Integral Calculus*, Cambridge, 1816

## Exercise 2

Write a *deliberately bad* 500-word essay on any topic relating to the vacation reading. Swap essays with someone else in the class and critique each other's work. In the first class in HT, we will consider what makes a bad essay.