In this talk, we will discuss the implementation of the so-called Method of Frobenius into the symbolic computer program Mathematica.

The Method of Frobenius, which can be traced to work of L. Fuchs in the early 1860’s and refined by G. Frobenius in the early 1870’s, describes a method to obtain a basis of (generalized) power series solutions to a certain class of homogeneous ordinary differential equations; these solutions are expanded about a regular or regular singular point of the differential equation. One of the best accounts of this method can be seen in the classical treatise Ordinary differential equations (Dover Publications, New York) by E. L. Ince.

Working with B. M. Brown and D. K. R. McCormack, both from the University of Wales (Cardiff), this speaker will discuss their joint project of developing a symbolic code, within the framework of Mathematica, for computing these Frobenius solutions. The intention was to create a program that could be used for both educational and research purposes. The user has the option of selecting any of 30 pre-coded examples or entering her/his own example into the program. Other features and options include graphing the (approximate) solutions, interactive or automatic control of the number of terms computed, and explicitly determining the highest non-trivial logarithm power that a particular Frobenius solution may have.

Examples will be demonstrated and discussed during the talk.