1116-00-2998 **Jean-Philippe Lessard***, Universite Laval, Quebec. *Delay Differential Equations and Continuation*

An intriguing feature of the study of nonlinear delay differential equations (DDEs) is that progress in understanding their dynamics has been slow and has involved deep mathematical ideas. This is perhaps not surprising as a large class of DDEs naturally give rise to infinite dimensional nonlinear dynamical systems. Even for the simplest-looking DDEs, many fundamental dynamical questions remain open. In particular, the study of the global dynamics of Wright's equation defined by

$$y'(t) = \alpha y(t-1)[1+y(t)], \quad \alpha \in \mathbb{R}, \tag{1}$$

has been the subject of active research for sixty years. In 1955, E. M. Wright considered this equation because of its role in the distribution of prime numbers [6]. A conjecture (stated by Jones in 1962 [7]) asserts that (1) has a unique slowly oscillating periodic solution for all $\alpha > pi/2$; i.e., a periodic solution that oscillates around 0, spending more than one unit of time (per period) on either side of 0.

In this lecture we show how ideas from rigorous computations can be used to study the dynamics of DDEs. In particular, with the help of Fourier series, we introduce a continuation method to compute global branches of periodic solutions of DDEs. (See more at http://www.ams.org/meetings/short-courses/short-course-general#les.) (Received December 03, 2015)