PIMS / AMI Seminar

Friday, October 20, 2017
3:00 p.m.
CAB 657

"Theory of Shanks sequence transformations and the topological epsilon-algorithms"

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Abstract

When a sequence of numbers is slowly converging and when it is impossible to have access to the process producing it, it can be transformed, by a *sequence transformation*, into a new sequence which, under some assumptions, converges faster to the same limit. Among these general techniques is *Shanks' transformation* (Shanks, 1949, 1955) which is arguably the best all-purpose method for accelerating convergence of sequences. First, this transformation will be explained. Then, we will see how it can be recursively implemented by the ε-*algorithm* of Wynn (1956). This algorithm can be transformed to treat sequences of vectors (Wynn, 1962). But, since its algebraic theory is quite complicated, another way to extend Shanks transformation to sequences of elements of a general vector space was proposed (C.B., 1975). This *topological Shanks transformation* was recently overgeneralized, and it gave rise to a framework including many well-known methods transformations such as the MMPE, the MPE, the RRE, and others (C.B., M.R.-Z., Y. Saad, 2017). Finally, we will see how the topological Shanks transformation can be recursively implemented by the *topological ε-algorithm* (C.B., 1975) whose rules will be described.

Refreshments will be served in CAB 649 at 2:30 p.m.