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MATHEMATICAL SCIENCES GROUP
AND
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4:00 P.M.
THORVALDSON 159

SPEAKER

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TITLE

The Conjecture of Kenichi Fukui - "A Supreme Patterner of Chao" and Global Pattern Recognition in Physicochemical Network Systems

ABSTRACT:

With the advent of his Frontier Electron Theory (FET), Kenichi Fukui (1918 ~ 1998, 1981 Nobel Prize) pioneered a new way of looking at organic chemical reactions through his aspect of molecular orbital patterns. The FET illuminated a variety of empirical facts of organic chemical reactions in a unifying manner. In his later life, Fukui presented a mathematical conjecture, of which the speaker, a disciple of his, gave an affirmative proof. This proof enabled the speaker to extend Fukui's scientific methodology in the FET to a new theory of axiomatic nature, referred to as the Repeat Space Theory (RST). The generic language of the RST equipped with the unifying methodology assisted in dissolving the traditional boundaries between various mathematical investigations; in particular between investigations of (i) the zero-point vibrational energy of hydrocarbons and (ii) the total π-electron energy of alternant hydrocarbons. Global pattern recognition plays a central role in the RST. Here a sequence of physicochemical networks having many identical moieties is associated with an element in an infinite dimensional linear space, called a repeat space. The speaker presents elementary accounts of the empirical background, the genesis of the first proof, and the implication of the Fukui conjecture. Computer aided matrix pattern images are provided in the presentation of the genesis of the first proof.

Note: Recent papers of the speaker concerning the Fukui conjecture on which the present talk is based are available at:
https://duke.usask.ca/~arimoto/consortium/J/MCC1.htm.