

*The Hong Kong Polytechnic University  
Department of Logistics and Maritime Studies  
Research Seminar*

## **Exact Algorithms for Minimum Sum-of-Squares Clustering**

**(join work with Daniel Aloise)  
Gerad and HEC Montreal**

by

**Professor Pierre Hansen  
Professor  
HEC Montreal**

**Date: 26 July 2016 (Tuesday)  
Time: 10:30am - 11:30am  
Venue: M802, Li Ka Shing Tower  
The Hong Kong Polytechnic University**

**(Conducted in English)**

### **Abstract:**

Cluster analysis, also called clustering, aims at solving the following very general problem: given a set of entities find subsets, also called clusters, which are homogeneous and/or well separated, criteria for homogeneity and separation are numerous. The most used criterion is minimum sum-of-squares. We review exact methods for this problem and provide new ones. In particular, we show this problem is NP hard and provide a new branch and bound algorithm which augments the size of instances solved exactly by a factor of ten.

### **Bio:**

Prof. Pierre Hansen, born in Great-Britain in 1940, studied at University of Brussels (BAA in chemical engineering, MS in operations research, PhD in mathematics). He taught operations research and its applications in 17 universities in 9 countries. His research is mainly on methods of combinatorial programming and global optimization with applications to location and clustering problems. He wrote about 400 research papers with over 100 collaborators. They were published in Mathematical Programming 9 times, Management Science 4 times, Operations Research 6 times, Mathematics of Operations Research 3 times, Discrete Mathematics 10 times, Discrete Applied Mathematics, over 20 times, and other journals. Prof. Hansen has received various scientific prizes including the EURO Gold Medal in 1986, and the award of Merit of the Canadian operations research society in 1999. He is a member of the Royal society of Canada, and of the international academy of mathematical chemistry.

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**All are welcome!**