



**The Hong Kong Polytechnic University  
Department of Applied Mathematics**

## **Colloquium**

On

**Polynomial approximation on spheres  
-- from de la Vallée Poussin to filtered  
hyperinterpolation**

by

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### **Abstract**

For trigonometric polynomial approximation on a circle, the century-old de la Vallée Poussin construction has two almost contradictory properties as the polynomial degree  $L$  goes to infinity: it exhibits uniform convergence for all continuous functions; yet it also has arbitrarily fast convergence for sufficiently smooth functions. It is only allowed to have both properties simultaneously because it is a uniformly bounded but not positive linear map onto the space of trigonometric polynomials of degree  $L$  or less. In this talk I present a generalisation of the de la Vallée construction to higher dimensional spheres. Such a generalisation seems to be not presently known. "Filtered hyperinterpolation" is the name given to a fully discrete version of the approximation, which exhibits the same pair of almost contradictory properties.

**Date : 29 April 2011 (Friday)**  
**Time : 2:30 p.m. – 3:30 p.m.**  
**Venue : Departmental Conference Room HJ610  
The Hong Kong Polytechnic University**

**\*\*\* ALL ARE WELCOME \*\*\***