



**UPM**  
UNIVERSITI PUTRA MALAYSIA  
BERILMU BERBAKTI

# INSPEM WEEKLY SEMINAR

02/2019

## Date & Time

11<sup>th</sup> January 2019, Friday @ 3.15 pm

## Venue

Ulugh Beg Laboratory, Second Floor,  
INSPEM

## Presenter

Dr. Sim Hong Seng  
Universiti Tun Abdul Rahman (UTAR)



## Topic

**Gradient Method with Multiple Damping for Large-scale Unconstrained Optimization**

Gradient methods are popular due to the fact that only gradient of the objective function is required. On the other hand, the methods can be very slow if the objective function is very ill-conditioned. One possible reason for the inefficiency of the gradient methods is that a constant criterion, which aims only at reducing the function value, has been used in choosing the step length, and this leads to a stable dynamic system giving slow convergence. To overcome this, we propose a new gradient method with multiple damping, which works on the objective function and the norm of the gradient vector simultaneously. That is, the proposed method is constructed by combining damping with line search strategies, in which an individual adaptive parameter is proposed to damp the gradient vector while line searches are used to reduce the function value. Global convergence of the proposed method is established under both backtracking and nonmonotone line search. Finally, numerical results show that the proposed algorithm performs better than some well-known CGbased methods.