

**Singapore Stanford Partnership Programme**

**MS Project MS08-15**

**Development of Kinematic Wave Runoff Model in MATLAB**

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Flood routing methods can be classified as hydraulic, in which both continuity and dynamic equations are used, or hydrologic, which generally uses the continuity equation alone. The kinematic wave approach falls into the first category. Kinematic waves govern the flow when inertial and pressure forces are not important. Thus, in a kinematic wave the gravity and frictional terms are balanced, so the flow does not accelerate appreciably. For these kinds of waves, the energy grade line is parallel to the channel bottom. It is used typically for flow routing in overland flow and storm drainage systems, and yields results of very acceptable accuracy. Solution to the kinematic wave equations is usually obtained numerically. The numerical process of flood routing usually involves a 'marching' solution in which the initial conditions are known at time  $t$  and it is required to predict conditions at time  $(t+Dt)$ . In this project, the student is expected to develop a routing model based on the kinematic wave equations, in MATLAB. As a basic requirement, the student is expected to translate an existing code for the kinematic wave model written in BASIC to MATLAB. He/she is then expected to enhance the model using features provided in MATLAB.