SU/PG 기법을 이용한 댐붕괴 수치모의
Numerical Simulation of Dam-Break Problem Using SU/PG Scheme

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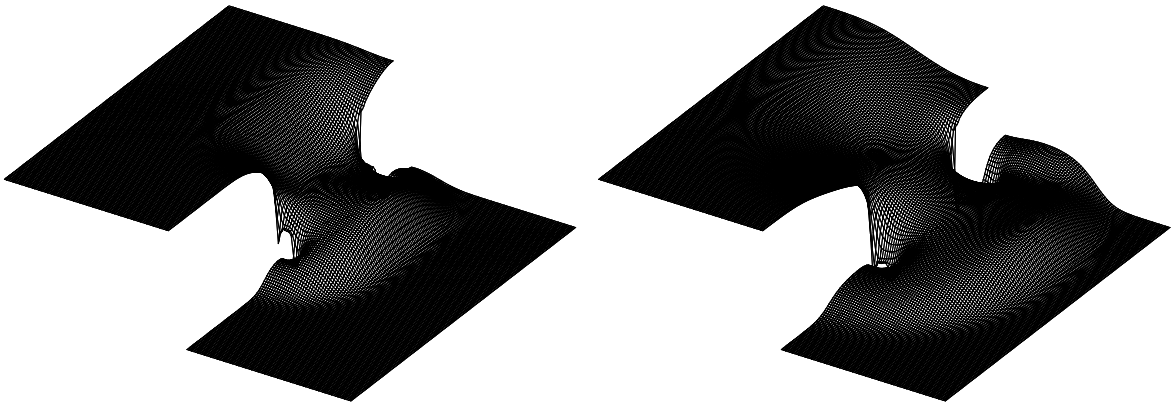
The numerical simulation of dam break problem suffers from several challenges in terms of accuracy, stability, and versatility of the simulation algorithm since the water flow is generally discontinuous and presents abrupt variations. Thus, to obtain stable and accurate solutions, flow models for this purpose require numerical schemes provided with shock-capturing properties, and with the ability to work with flexible two-dimensional meshes. In this context, SU/PG method(Hughes and Brooks, 1979) is excellent candidate for the solution of the dam break problem. The weak formulation of the equations and the discontinuous polynomial basis lead to an accurate representation of bore waves(shocks). Furthermore, the discretization of the domain in finite elements is extremely effective in modeling complex geometries.

In this study, a finite element model based on the SU/PG scheme is developed to solve shallow water equations and the model is applied to dam break problem. It is found that the present model accurately captures the bore wave that propagates downstream while spreading laterally and the depression wave that moves upstream. Furthermore, the propagation and formation of water surface profile compared favorably with those obtained by the previously published results.



(a) t=3.6 sec. (b) t=7.2 sec.

Fig. 1 Water surface profiles

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