

AN ANALYSIS OF SHALLOW WATER FLOW USING STABILIZED BUBBLE FUNCTION

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This paper presents an analysis of shallow water flow using stabilized bubble function. Japan is island nation and surrounded by seas. There are heavy damage resulting from the earthquake, tsunami, heavy rain, flood and so on in this country. Especially the river in Japan has a sharp inclination, with the result that those are easy to flood by the rainy season and typhoon and cause quite a lot of harm to many people. We need to predict and obviate disaster to coexist nature. Numerical analysis is used as one of the important way to predict and obviate disaster. This method increases in importance by computer development in recent years especially.

In this research, two kinds of unsteady flows are analyzed using rectangle channel. One is dam break problem. In this problem, numerical result is compared with theoretical analysis. The other is hydraulic jump phenomenon is analyzed.

To calculate the flow phenomenon, the shallow water equation is employed. The Crank-Nicolson method which is capable of taking the large time increment and superior in stability is applied to temporal discretization. The quasi-linear approximation of advection is given by Adams-Bashforth formula which has second order accuracy. The stabilized bubble function is applied to spatial discretization. In this study, the shock-capturing term is applied.

References

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