

Analytical study for head-on and overtaking collisions of solitary waves

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SUMMARY

This work elucidates the interaction effects of collision between two solitary waves moving in the same or opposite direction. An explicit superposition method is presented to describe the interaction effects for both overtaking and head-on collision. In addition, some appropriate transforms adapted from Hirota's method are used herein. The analytical results indicate that phase shifts will occur after the interaction of solitary waves. Moreover, the run-up phenomenon occurs for head-on collision. The run-down phenomenon appears for the overtaking collision as well. Both the promotion and attenuation of the total wave amplitude agree with those of previous experiments very well.
