On a higher-dimensional integrable equation associated with the Wadati-Konno-Ichikawa hierarchy

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It is well-known that the Harry-Dym equation [1]: $u = u(x,t)$

$$u_t + \frac{1}{4}u^3 u_{xxx} = 0,$$

is one of integrable systems associated with the Wadati-Konno-Ichikawa (WKI) hierarchy [2]. And a higher-dimensional Harry-Dym equation has been presented by using an extension of the Lax pair [3] . We shall discuss another higher-dimensional Harry-Dym equation: $u = u(x,z,t)$

$$u_t + \frac{1}{4}u^3 u_{xxx} + \frac{m}{4}\left\{ u u_{xx} u_z - u u_x u_{xz} + u^2 u_{xxz} + u^3 u_{xxx} \int \frac{u_z}{u^2} dx \right\} = 0,$$

where m is an arbitrary constant, and its nonisospectral zero-curvature representation.

References

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