Conclusion

A simple and reliable algorithm based only on the fundamental operation properties of differential transform and calculus for calculating the one-dimensional differential transform of nonlinear function has been developed. This new technique avoids the difficulties and massive computational work that usually arise from the standard method. The proposed algorithm is illustrated by solving several nonlinear ordinary differential equations including Troesch’s and Bratu-type problems. The calculated results are exactly the same as those obtained by other analytical or approximate methods.

Two- and three-dimensional differential transform have been applied to linear and nonlinear systems of PDEs. The results for all examples showed that exactly the same solutions have been obtained with decomposition method.

The present method reduces the computational difficulties of the other methods and all the calculation can be made simple manipulations. On the other hand the results are quite reliable. Therefore, this method can applied to many complicated linear and nonlinear PDEs and system of PDEs and does not require linearization, discretization or perturbation.
References


