Meeting: 1003, Atlanta, Georgia, SS 27A, AMS-SIAM Special Session on Analysis and Applications in Nonlinear Partial Differential Equations, I

1003-65-631 **Hongjie Dong*** (hjdong@math.umn.edu), 127 Vincent Hall, 206 Church St SE, Minneapolis, MN 55413, and **Nicolai V. Krylov** (krylov@math.umn.edu), 127 Vincent Hall, 206 Church St SE, Minneapolis, MN 55413. *On the Rate of Convergence of Finite-difference Approximations for Bellman Equations with Constant Coefficients.*

We consider elliptic Bellman equations with coefficients independent of variable x. Error bounds for certain types of finite-difference schemes are obtained. These estimates are sharper than those earlier results.

We use the standard symmetric approximation for the second order derivatives and two approximations for the first derivative: the monotone one, which depends on the sign of the coefficient in front of the derivative, and the symmetric one like $[u(x+h)-u(x-h)]/(2h)$. We also assume the free terms is $\mathcal{C}^{1,1}$ and prove that, with monotone approximation of the first-order term, the error bound is of order h and not better.

By assuming more structure on the equation and using the symmetric approximation of the first derivatives we obtain the error bound of order h^2 and show that it is sharp. (Received September 25, 2004)