

ZMATH 2014f.00699

Jain, Nitin A.; Murthy, Kushal D.; Hamsapriye

Matrix methods for finding $\sqrt[v]{m^u}$.

Int. J. Math. Educ. Sci. Technol. 45, No. 5, 754-762 (2014).

Summary: An iterative algorithm for finding $\sqrt[v]{m^u}$, ($m > 0$, $u < n$), is developed which involves generating a sequence of approximations to $\sqrt[v]{m^u}$ using the concept of eigenvectors. The convergence of this method is then established by studying the eigenvalues and eigenvectors of a matrix A_n , directly related to the algorithm itself. The matrix A_n is constructed using the eigenvalues and eigenvectors, applying the concepts of diagonalization. An algorithm for finding higher powers of A_n is explained. Using these higher powers of A_n , a direct method is also derived. Two numerical examples explaining the methods are given.

Classification: H65 N55

Keywords: diagonalization; n th roots of unity; linearly independent eigenvectors; spanning space; auto-correlation; convolution

doi:10.1080/0020739X.2013.877607