

# Superconvergence of the Velocity Along the Gauss Lines in Mixed Finite Element Methods. Mathematical Sciences Institute, Cornell University, 1989. 1989. R. E. Ewing, R. D. Lazarov, J. Wang

A least-squares mixed finite element method over quadrilaterals is formulated and applied for a class of second order elliptic problems. A superconvergence result is established for approximate... R. E. Ewing, R. D. Lazarov, J. Wang. Superconvergence of the velocity along the Gauss lines in mixed finite element methods. *SIAM J. Numer. Anal.*, 28(1991), no. 4, pp. 1015-1029. [MathSciNet](#) [bMATH](#) [CrossRef](#) [Google Scholar](#). [9] R. E. Ewing, M. M. Liu, J. Wang. Superconvergence of mixed finite element approximations over quadrilaterals. *SIAM J. Numer. Anal.* [11] Chen, Y., Superconvergence of mixed finite element methods for optimal control problems, *Math. Comput.*, 77 (2008), pp. 1269-1291. [CrossRef](#) [Google Scholar](#). [12] Chen, Y., Dai, L. and Lu, Z., Superconvergence of rectangular mixed finite element methods for constrained optimal control problem, *Adv. Appl. Math.* [22] Ewing, R. E., Lazarov, R. D. and Wang, J., Superconvergence of the velocity along the Gauss lines in mixed finite element methods, *SIAM J. Numer. Anal.*, 28 (1991), pp. 1015-1029. [CrossRef](#) [Google Scholar](#). [23] Falk, F. S., Approximation of a class of optimal control problems with order of convergence estimates, *J. Math. Anal. Appl.*, 44 (1973), pp. 28-47. [CrossRef](#) [Google Scholar](#). The Finite Element Method Fifth edition. Volume 1: The Basis. Professor O.C. Zienkiewicz, CBE, FRS, FEng is Professor Emeritus and Director of the Institute for Numerical Methods in Engineering at the University of Wales, Swansea, UK. He holds the UNESCO Chair of Numerical Methods in Engineering at the Technical University of Catalunya, Barcelona, Spain. He was the head of the Civil Engineering Department at the University of Wales Swansea between 1961 and 1989. He established that department as one of the primary centres of finite element research. In 1968 he became the Founder Editor of the