

**A NEW METHOD FOR NUMERICAL TREATMENT OF DIFFUSION  
COEFFICIENTS AT CONTROL VOLUME SURFACES**

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**ABSTRACT** The diffusion coefficients at control volume surfaces are required in the most-widely used finite-volume method for numerical simulation of convection-diffusion equations. Various interpolation methods for diffusion coefficients at control volume surfaces are briefly discussed and extensively compared with the analytical solutions of both pure diffusion and convection-diffusion problems in this paper. It is found that the harmonic mean method is not as accurate and reliable as it is supposed to be and in reality there are some situations in which it simply fails to work and could not produce physically true results. A new method is thus developed by careful re-examination of the exact meaning of the definition of these control surface diffusion coefficients. The extensive numerical comparisons are given for both the harmonic mean and the present method and the results show that the method proposed in this paper is accurate, reliable and easy to use.