EVALUATION OF THE APPLICABILITY OF THE ALTERNATIVE FRICTION FACTOR EQUATIONS TO COLEBROOK-WHITE

Kim Rocha Gama

Ricardo Albuquerque Fernandes

Diogo Tenório Cintra

Adeildo Soares Ramos Júnior

Eduardo Setton Sampaio da Silveira

{kim.rocha, ricardoaf, diogotc, adramos, eduardosetton}@lccv.ufal.br

Laboratório de Computação Científica e Visualização - UFAL

Av. Lourival Melo Mota, s/n, 57072-900, Maceió, Alagoas, Brasil

Abstract. *This work proposes the evaluation of alternative equations for pipe flow analysis. In this phenomenon, several forces are present in the energy balance. Considering Darcy-Weisbach equation for pressure loss, a friction factor is added to the pipe flow equation of natural gases. In many practical situations, the literature recommends the use of Colebrook-White equation for numerical pipe flow analysis, set as a reference for the friction factor calculation. Due to the implicit nature of this equation, depending on the number of nodes, pipes and the topology of the considered mesh, the computational time demanded for the determination of the friction factor can have a great influence on the total computational time of the numerical analysis. Therefore, other expressions have arisen with the objective of simplifying these calculations. They can be used depending on the flow conditions and the pipe material. Thus, it is necessary to evaluate in detail the precision and the computational cost associated to the use of these alternative equations, comparing them to the reference, Colebrook-White. The alternative equations considered in this work are: Chen equation, Shacham equation, AGA Fully turbulent equation, among others. Graphs and diagrams will be shown in the way to validate the proposed evaluation.*

Keywords: *Pipe flow analysis, Darcy-weisbach friction fator, Colebrook-white equation.*