

Abstract

Mohamed R. Elsayed Shouman

Flow-Induced Vibration on the Control Valve with a Different Concave Plug Shape Using FSI Simulation

Control valves have always been recognised as being among the most crucial control equipment, commonly utilised in versatile engineering applications. Hence, the need has arisen to identify the flow characteristics inside the valve, together with the incurred vibration induced as a result of the flow passing through the valve. Thanks to the tangible and fast progress made in the field of the flow simulation and numerical techniques, it has become possible to better observe the behavior of the flow passing inside a valve with view to examining its performance. Hence, the paper at hand is mainly concerned with introducing the modeling and simulation of a control valve. On the contrary, the flow system in a control valve is marked by a complex structure and nonlinear characteristics. The reasons for those qualities could be attributed to its construction as well as the fluid flow phenomena associated with it. It is especially for the sake of investigating and observing the flow characteristics, pertaining to a control valve equipped with different concave plug shapes and different openings, that the three-dimensional FSI simulation is conducted. In addition, it would be possible to make use of the obtained results relating to the three-dimensional analysis to achieve low noise and high efficiency improvement. Furthermore, all results will be validated on experimental grounds.