

ABSTRACT

Ultrasonic is the study of sound propagated at frequencies beyond the range of human audibility which is above 18 kHz. Ultrasonic techniques are very widely used for the detection of internal defects in materials, but they can also be used for the detection of small cracks. Ultrasonic is used for the quality control inspection of finished components. The techniques are also in regular use for the in-service testing of parts and assemblies [8]. The ultrasonic tomography consists of three types of sensing techniques namely the transmission-mode, reflection-mode and the diffraction-mode method [2,7]. It involves the application of noninvasive ultrasonic sensors to obtain the information in order to develop the concentration map of the dynamic characteristics of process vessels in industries. This information together with the concentration map will derive the result to the mass flow rate, which will then provide the quantity of flowing volume in process vessels [1,6]. In the study of tomography the physical principle of a sensing system depends on the reconstructed image of the cross sectional distribution of the constituent parameter. It is evaluated by arraying ultrasonic sensors non-invasively on the surface of the vessel. By using the electronic circuits to interface, the data captured can be processed and analyzed by the computer to reveal the information of the internal dynamic characteristics [3].