An ultrasonic flow meter simulation for actual use

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Objectives

For newly developed ultrasonic flow meter (“Laminar-type multi-layer method”), it is difficult to estimate its characteristics by using commercial software, because of the existence of transition from laminar to turbulent. So, we tried to analyze the flow for steady condition by using “K” computer making use of DNS, and at the same time to analyze the ultrasonic propagation phenomena. In this year, we focused on a practical model analysis based on a basic model analysis conducted in last year. Our purpose exists in forecasting characteristics of this ultrasonic flow meter.

Outline of Results

In the study for steady flow analysis of multi-layer flow path for a practical model, transition behavior can be obtained precisely as well as a basic model analysis. For multi-layer flow path, Navier-Stokes equation and wave equation are solved with a separating method. The flow velocity of each layer is obtained with good accuracy. As a result, we are convinced of the possibility of simulation for comprehension of phenomena and forecasting the characteristics of the actual model for an ultrasonic flow meter. We are going to approach the possibility of predicting characteristics in case of changing parameter of an actual model.