

SIGNAL PROCESSING METHOD, SIGNAL PROCESSING DEVICE, AND CORIOLIS
FLOW METER

Abstract

[Summary]

[Object] Provided are a signal processing method, a signal processing apparatus, and a Coriolis flowmeter, which are capable of always performing measurement with constant precision and performing phase measurement with high filtering performance and a small amount of computation even when a temperature of a fluid to be measured changes, air bubbles are mixed into the fluid to be measured, or the fluid to be measured rapidly changes from a gas to a liquid.

[Solving Means] In the Coriolis flowmeter in which at least one of a phase difference and a vibration frequency proportional to a Coriolis force acting on at least one flow tube or a pair of flow tubes is detected, to thereby obtain at least one of a mass flow rate and a density of the fluid to be measured, the signal processing apparatus includes: A/D converters for converting analog signals, which are output from a pair of vibration detection sensors, to digital signals, respectively; a frequency measurement unit for measuring a vibration frequency θ of the at least one flow tube or the pair of flow tubes; a transmitter for generating a frequency signal having a frequency thereof set to $\theta(1-1/N)$ of a frequency

of a digital frequency signal output from the frequency measurement unit; and a pair of orthogonal frequency converters for converting, based on the frequency signal generated by the transmitter, frequencies of two of the digital signals corresponding to the pair of vibration detection sensors, which are output from the A/D converters, respectively, and generating digital signals having frequencies thereof set to $1/N$ of frequencies of the two of the digital signals, respectively. As a result, the phase difference is obtained by using the digital signals generated by the pair of orthogonal frequency converters.

[Selected Drawing] Fig. 2