Force Sensing in a Multilayered Ceramic Actuator Using a Piezoelectric Ceramic Plate

Hideto Tanaka, Yuuta Matsuse¹ and Tatsuo Fukami¹

Suzuki Co. Ltd., Department of Development, 2150-1 Ogawara, Suzaka-shi, Nagano, Japan
¹Faculty of Engineering, Shinshu University, 4-17-1 Wakasato, Nagano-shi, Nagano, Japan

(Received May 17, 2002; accepted July 25, 2002)

Key words: piezoelectric effect, nonlinear characteristics, load detection, actuator, pressure sensor

A method of sensing the force of a multilayered ceramic actuator using a piezoelectric ceramic plate is described. The newly developed system consists of a mutually bonded piezoelectric actuator and a piezoelectric ceramic plate, which are interposed between nonlinear elastic elements. The graphical analysis suggested that a small signal superimposed on the driving voltage of the actuator makes it possible to detect the force and a subsequent experiment confirmed thus.