ABSTRACT

Micro-fluidic devices are getting enormous attention in the field of printing, bio-medical as well as material science and chemistry. These devices have the ability to pass fluid in micro range which makes then suitable for drug delivery and insulin delivery as well as other medical applications. Various types of micro-fluidic devices are currently being used in medical field including mechanical and non-mechanical micro-fluidic devices. The actuation for pumping the fluid in a micro-fluidic device can be achieved using various different phenomenon' including electric, magnetic, piezo, electromagnetic and electrostatic rules. In this work electro-magnetic micro-pumps are analyzed and parametric estimation of their input parameters and the effect of input parameters on the output are analyzed. Results show that the magnetic field is directly influencing the flow rate as well as the velocity of the fluid that the micro-fluidic device is pumping. With increase in magnetic field, more energy is delivered to the charges of the fluid resulting in increase in its velocity and flow rate. On the other hand the diameter of the micro-pump decreases the flow rate as well as the velocity. The simulated and calculated values from the MAMDANI model are similar to each other with error less than 1% which shows the precision of the system.