Journal of Applied Mechanical Engineering
ISSN: 2168-9873
OPEN ACCESS Freely available online
Perspective

Fluidics: An Overview

Prabir Kumar*

Department of Microbiology, Utkal University, Bhubaneswar, Odisha, India

PERSPECTIVE

Fluidic logic, often known as fluidics, is the use of a fluid to execute analogue or digital operations in the same way that electronics can. Pneumatics and hydraulics are the physical foundations of fluidics, which are founded on the theoretical foundation of fluid dynamics. Ordinary hydraulic components such as hydraulic cylinders and spool valves are not classified or referred to as fluidic devices because they have no moving parts. A weaker jet impacting it on the side can deflect a jet of fluid. This produces nonlinear amplification in the same way that a transistor in electronic digital logic does. It's typically employed in systems exposed to high amounts of electromagnetic interference or ionising radiation, where electronic digital logic would be unreliable. Fluidics is one of the instruments used in nanotechnology. The effects of fluid–solid and fluid–fluid interface forces are frequently substantial in this sector. Military applications have also made use of fluidics.

Nikola Tesla patented a valvular conduit, often known as a Tesla valve that functions as a fluidic diode in 1920. It's a leaky diode, which means that for any applied pressure differential, the reverse flow is non-zero. Tesla valves have non-linear responses due to frequency dependency in diodicity. It could be used to convert AC to DC in fluid circuits like a full-wave rectifier. When Billy M. Horton of the Harry Diamond Laboratories (which eventually became part of the Army Research Laboratory) recognised that he could reverse the direction of flue gases using a small bellows in 1957, he came up with the idea for the fluidic amplifier. A fluid supply, such as air, water, or hydraulic fluid, enters at the bottom of a fluidic amplifier. The stream is deflected by applying pressure to the control ports C1 or C2, causing it to leave via either port O1 or O2.

The device has gain because the stream entering the control ports may be significantly weaker than the stream being deflected. This fundamental device can be used to build various fluidic logic elements, such as fluidic oscillators that can be used in the same way as flip flops. This allows for the creation of simple digital logic systems. Because fluidic amplifiers typically have bandwidths in the low kilohertz range, systems based on them are slow in comparison to electrical devices. The fluidic triode is an amplification device that sends the signal through a fluid. Murray O. Meetze, Jr., a high school student in Heath Springs, South Carolina, devised the fluidic triode in 1962, along with a fluid diode, a fluid oscillator, and a variety of hydraulic "circuits," including one with no electronic counterpart.

Correspondence to: Prabir Kumar, Department of Microbiology, Utkal University, Bhubaneswar, Odisha, India, E-mail: prabir.k@gmail.com

Received: June 10, 2021, **Accepted:** June 15, 2021, **Published:** June 20, 2021

Citation: Kumar P (2021). Fluidics: An Overview. J Appl Mech Eng 10:368.