In Mechanical Vibrations, the mass-spring-damper system is one of the most important systems in the topic. The system can be used to determine the equation of motion which is derived from Newton’s second law.

Where:

m is a mass of a point mass

F is the resultant of all forces.

A is the absolute acceleration.

From the Figure, the system consists of a damper with a damping coefficient ‘K’ and a spring with a spring constant of ‘d’ which are attached to the wall and a mass and an external force ‘F’.

The force from the spring can be expressed as

The force from the damper can be expressed as

Then, the resultant force can be determined from

Finally, the equation of motion is equal to