



## **A LOW COST THREE-DIRECTIONAL FORCE SENSOR**

S. Boukhenous

Laboratory of Instrumentation

Faculty of Electronics and Computers

USTHB, Bab\_Ezzouar, Algeria, [www.lins.usthb.dz](http://www.lins.usthb.dz)

Email: [sboukhenous@gmail.com](mailto:sboukhenous@gmail.com)

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*Abstract- In this work a low cost sensor has been developed to measure three-directional forces. The theory, design and sensor construction details are presented. It was constructed by using commercial strain gauges. Finite element method was adopted to optimize the structure dimensions, and improve the sensitivity of force sensor by distributing the sensing stress on the maximum strain positions. A hardware conditioning circuits was developed for the 3D force sensor. The calibration experiments were performed to calculate calibration coefficients by using the regression analysis method and test linear property of the sensor.*

**Index terms:** Strain gauge, three-directional forces, 3D force platform, gait and posture.