LABORATOIRE D'ELECTROTECHNIQUE ET D'ELECTRONIQUE DE PUISSANCE DE LILLE

Université de Lille

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L2EP Laboratoire d'électrotechnique et d'électronique de puissance de Lille

STINTS

Master project

Portable instrument to rapidly measure the mechanical properties of skin

Supervisor: Frederic Giraud frederic.giraud@univ-lille.fr
Betty Lemaire-Semail betty.semail@polytech-lille.fr

Research will be achieved at IRCICA, USR CNRS 3380,

Context

Being able to assess the integrity of patient's skin is a key issue for prevention of skin lesions such as pressure ulcers. The monitoring of the mechanical properties of skin (like the Young modulus) is a promising way to detect an early change in skin integrity, and will be explored within the framework of the H2020 ITN project *STINTS (Skin Tissue Integrity under Shear)*.

The objective is to create a portable tool that rapidly assesses the skin integrity by measuring the mechanical impedance. By using piezoelectric benders, that laterally stretch the skin and by measuring the force induced by the movement, preliminary results show that the relation between force and displacement can indeed be related to skin properties. Further work is needed to link the signal to an accurate diagnostic of the skin integrity.

Objective

The aim of the Master project is to design a prototype, based on the requirements of [1], which creates a calibrated mechanical shear strain of the skin, and in turn measures the force needed. Specific attention will be put to reduce parasitic forces in the system, as well as size and energy consumption. It is essential that the device is portable, and measurements are accurate. Therefore, a specific control unit, that can provide electrical energy to the piezoelectric benders and that can sample the measurements, will be designed [2, 3].

Moreover, the piezoelectric benders are in contact with the skin by two tips; a specific study of the tip's geometry will be conducted in order to ensure that a good stretch of the skin is achieved, without damage.

Keywords

Piezoelectric transducer, mechatronic.

References

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