



Hurst Index applied in the soil resistance measurements based on a harrow discs sensors

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The mechanical conditions of the soil is essential for the planning and implementation of agricultural tillage. Determining the variability of the soil by sensors helps to optimize the intensity of the use of tillage components, control their wear and improve the energy consumption of the operation. This work presents the development of hardness and plasticity parameters by means of sensors implanted in tillage components such as harrow discs. The vibration measurement by an electronic sensor integrated in a harrow disc is packaged and sent to a control node where it is transformed to the frequency space and parameterized through the power spectral density (PSD). The energy analysis makes it possible to establish the variability of the terrain in degrees of hardness and plasticity; and thereby determine differential harrow management or plot mapping for decision making.

Lately, a Detrended Fluctuation Analysis (DFA) of Hurst Index on these series were applied for first time. The persistence and antipersistent character of the Hurst index can help to identify the hardness of the plot analysed. Results are showed comparing different soil texture and soil humidity scenarios.