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DI GEOSCIENZE



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Arduino Lecture

Ground Source Heat Pump Systems: Overview and new TRT Interpretation Methods

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Aula Arduino

Relatore: **Prof. Philippe Pasquier**

Department of Civil, Geological and Mining Engineering, Polytechnique Montréal. Visiting Scientist at Department of Industrial Engineering of Padua University (May-December 2017)

Abstract:

Ground-source heat pump systems can provide significant energy savings, especially in cold climates where space heating requirements are high. The design of these systems however requires knowing the local ground thermal properties. Thermal response tests (TRT) are now commonly used to identify these before designing any major system. The prevailing interpretation technique relies on the first-order approximation of the infinite line-source model, which is widely used in hydrogeology to interpret pumping tests. This graphical method is simple and provides the desired thermal parameters easily. However, the approximation made to linearize the infinite line-source limits the interpretation to TRTs with constant heating power. Optimization-based interpretation techniques can find the parameters of interest by minimizing an objective function describing the misfit between the experimental and simulated temperatures. Regardless the interpretation method used, the parameters obtained are always highly correlated with each other and relatively sensitive to measurement errors. The use of multi-objective function and advanced interpretation models can be useful to identify accurately the local thermal properties before sizing closed-loop or standing column well systems.

Proponente: Antonio Galgano