CPT 조사결과에 대한 ℝ/S 해석기법의 활용방안 고찰
Rescaled Range Analysis of CPT Data

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Abstract

일반적으로 지반이 불균질하다는 사실은 잘 알려져 있으며, 그에 따라서 콘관입시험기 (CPT)나 기타 현장에서 연속적으로 자료를 수집할 수 있는 장치들의 실험결과들도 그 경향이 일정하지 않고 불규칙한 경우들을 자주 접하게된다. Rescaled-range 해석법은 그러한 경우에 고려될 수 있는 한 대안으로서 본 연구에서는 CPT 실험자료에 대해서 그 적용 가능성을 고찰하였다.

요 약

A physical phenomenon or the data representing it are considered random when a future time history record cannot be predicted within resonable experimental error from an experiment. Random processes with long range power law correlation have been observed in a variety of fields including economics, geosciences, physics and biology. The soil also is a heterogeneous media and has shown the random process in most of their physical or mechanical behaviors, so that geotechnical investigation results appeared the extremely random pattern even though these were continuously collected in the same place.

There are roughly two types of tools used in assessing the presence of such correlation in continuous series data; spectral domain methods represented by power spectrum analysis, and random walk methods in the space domain represented by the rescaled(R/S) range analysis. Long range correlations are characterized by a quantity called the hurst exponent H, in the R/S analysis.

R/S range analysis method was originally evolved by Hurst(1951) and means that very long range correlations were found in the time-series data, which may contradict the intuitive notion that natural time series have short term memory, so that events separated by several years or decades may be considered independent in a statistical sense.

In this presentation, Hurst exponent of CPT data was analyzed to fine the compatibility of rescaled-range analysis method to model the spatial geotechnical information using R/S analysis method.