Simple Overview of Statistical Concepts of week 4

Time series. Time series refers to a statistical model that describes collection of data that are gathered over regular intervals of time. It is used to study how a data change and evolve over a specific period (seconds, hours, days, years). Time series data are commonly used to analyze trends, patterns, and relationships in data over time. By examining the sequential order and time-based dependencies within the data, time series analysis enables to make predictions and gain insights into the behavior of the observed variable over time.

Stationary time series. Weakly stationary time series refer to a type of data where the statistical properties remain constant over time. This means that the mean and variance of the series do not change with time. Autocovariance measures the covariance between values at different time points. It helps in understanding the dependence or relationship between observations at different time points within the same series.

Random fields. A random field is a statistical model used to describe and analyze raster spatial data across a region. They are composed of a collection of random variables, where each variable corresponds to a specific location in space or time. Realizations of random fields are specific instances or samples generated from these models, representing different possible spatial patterns or configurations.

Covariance functions characterize the statistical relationship between different locations or points in the field. They quantifies the extent to which the values of random variables in two locations are correlated or related to each other.

Spatial trend. Spatial trend refers to the gradual change or pattern in a variable across a spatial area. In theory, any function can serve as a spatial trend, but in practice, it must align with spatial data. Determining the spatial trend involves analyzing the distribution of the variable and identifying the functional relationship between the variable and its location. This analysis often involves visual examination of images to uncover the underlying trend in the data.

Positive definite functions. Not all mathematical functions can be used to describe dependencies between different spatial locations. Positive definite functions are mathematical concept that is useful to describe the covariance between pairs of variables. A positive definite function ensures that the covariance matrix formed by evaluating the function for all pairs of locations is well-defined and consistent for different combinations of spatial locations.

Transformations of spatial data for better visualization. Transformations of spatial data enhance visualization by altering the format or properties of the data. Such modifications can include changing the coordinate system, adjusting scale, applying different colors, etc. These transformations can help to better interpret spatial data, improve modeling and identification of significant patterns.

Ranking of numeric data in increasing order involves arranging the numbers from smallest to largest, assigning a unique natural number to each observation based on its position in the sorted sequence.

Quintiles represent divisions of numeric data into five equal parts, where each part contains 20% of the observations. It helps to understand the distribution of the data and identify spatial locations of values that fall into specific ranges.