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***Statistics for Engineers***

***2. Measures of Central Location and Spread***

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Calculate for the following exercises the mean, the 5% trimmed mean, the median, the interquartile range, the 30%-quantile, the variance, the standard deviation, the coefficient of variation, the five-point-summary, and construct a boxplot.

**1) Air Quality.** The dataset "airquality" form the R-package {datasets} contains daily air quality measurements in New York, May to September 1973. The data were obtained from the New York State Department of Conservation (ozone data) and the National Weather Service (meteorological data). Reference: Chambers, J. M., Cleveland, W. S., Kleiner, B. and Tukey, P. A. (1983) *Graphical Methods for Data Analysis*. Belmont, CA: Wadsworth.

Daily readings of the following air quality values for May 1, 1973 (a Tuesday) to September 30, 1973.

Ozone: Mean ozone in parts per billion from 1300 to 1500 hours at Roosevelt Island

Solar.R: Solar radiation in Langleys in the frequency band 4000–7700 Angstroms from 0800 to 1200 hours at Central Park

Wind: Average wind speed in miles per hour at 0700 and 1000 hours at LaGuardia Airport

Temp: Maximum daily temperature in degrees Fahrenheit at La Guardia Airport.

**2) Snow.** The article “Snow Cover and Temperature Relationships in North America and Eurasia” (J. Climate and Applied Meteorology, 1983: 460–469) used statistical techniques to relate the amount of snow cover on each continent to average continental temperature. Data presented there included the following ten observations on October snow cover for Eurasia during the years 1970–1979 (in million km²): (Data: ex01.37)

What would you report as a representative, or typical, value of October snow cover for this period

**3) Escape Time.** A sample of 26 offshore oil workers took part in a simulated escape exercise, resulting in the accompanying data on time (sec) to complete the escape (“Oxygen Consumption and Ventilation During Escape from an Offshore Platform,” Ergonomics, 1997: 281–292): (Data: ex01.36)

**4) Crankcase Lubricants.** The article “A Thin-Film Oxygen Uptake Test for the Evaluation of Automotive Crankcase Lubricants” (Lubric. Engr., 1984: 75–83) reported the following data on oxidation-induction time (min) for various commercial oils: (Data: ex01.51)