In this eighth installment of our introduction to SAS, we will introduce methods for constructing confidence intervals and carrying out hypothesis tests for the mean of normal distributions with unknown mean and unknown variance.

DATA SET:
For this demonstration we will simulate a pseudo random sample of size n=20 from a normal distribution with mean 1 and standard deviation 0.2.

OBJECTIVE:
Our objective is to write a SAS code that carries out following tasks:

1. Create the pseudo random sample described above. The data set will be called test and the variable will be denoted by $x$.

2. Using PROC MEANS, create a 90% confidence interval for the mean of the population.

3. Using PROC MEANS, test the hypothesis $H_0: \mu = 1$ vs. $H_1: \mu \neq 1$.

4. Using PROC MEANS, create a 99% confidence interval for the mean of the population.

5. Using PROC MEANS, test the hypothesis $H_0: \mu = 2$ vs. $H_1: \mu \neq 2$.

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1 Please direct any comments or suggestion to Kouros Owzar (owzar@email.unc.edu).
SAMPLE SAS CODE:

DATA test;
   DO i=1 TO 20;
      x=1+0.2*NORMAL(45);
      OUTPUT;
   END;
   KEEP x;
RUN;QUIT;

DATA test1;
   SET test;
   xcent=x-1;
RUN;QUIT;

DATA test2;
   SET test;
   xcent=x-2;
RUN;QUIT;

PROC MEANS DATA=test CLM ALPHA=0.1;
   VAR x;
RUN;QUIT;

PROC MEANS DATA=test1 PRT;
   VAR xcent;
RUN;QUIT;

PROC MEANS DATA=test CLM ALPHA=0.01;
   VAR x;
RUN;QUIT;

PROC MEANS DATA=test2 PRT;
   VAR xcent;
RUN;QUIT;

FINAL NOTE:
1. By default, the level of significance for PROC MEANS is 0.05.

2. PROC MEANS, only allows one to test, $H_0: \mu = 0$ vs. $H_1: \mu \neq 0$, directly. If you are testing, $H_0: \mu = 1$ vs. $H_1: \mu \neq 1$, for example, you must center the data by the hypothesized mean (as I have done).