# DAE 8th Example 3.4

## Given:

Test the equality of variance!

Here we can use the Barlett test! Only when the assumption of normality holds!!

The Hypothesis to test

H0: sigma\_1^2= sigma\_2^2=… sigma\_n^2

H1: at least one sigma\_i is different from the rest

The statistic is Chi-squared distributed (if the normality assumption holds) under H0. In MATLAB code

%DAE 8th Example 3.4

%Bartlett test

%

%H0: all variances are equal

%H1: at least one is different from the rest

alfa=0.05;

% The data.

Y=[575, 542, 530, 539, 570;

565, 593, 590, 579, 610;

600, 651, 610, 637, 629;

725, 700, 715, 685, 710];

%power levels [W], corresponding to rows in Y

P=[160, 180, 200, 220];

n=size(Y,2); %number of replicates

N=size(Y,1)\*size(Y,2); %number of runs

a=length(P); % number of treatments

S\_i=std(Y,0,2);

n\_vector=n\*ones(size(S\_i));

S\_p=sqrt(((n\_vector-1)'\*S\_i.^2)/(N-a)); %note the vector multiplication

q=(N-a)\*log10(S\_p^2)-(n\_vector-1)'\*log10(S\_i.^2); % 0.2079

c=1+((3\*(a-1))^-1)\*sum((n\_vector-1).^-1-(N-a)^-1); %X1.0833

X0pw2=2.3026\*q/c; %0.4418

Xrefpw2=chi2inv(1-alfa,a-1); %7.8147

%X0pw2<Xrefpw2 H0 cannot be rejected!! No evidence suggesting that the

%variances are not equal.