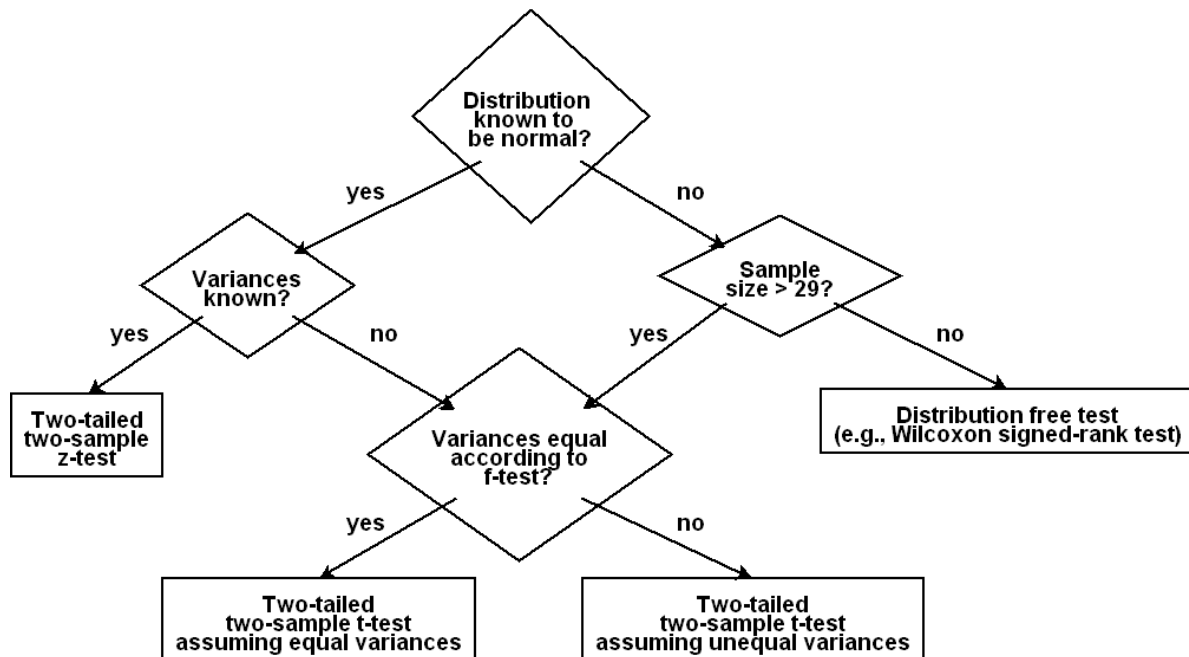


# Decision Tree for selecting appropriate statistical test for comparing the means of the results of two stochastic algorithms



## Using Microsoft Excel 2003/2007/2010

The first thing you should do is check whether you have Excel's Analysis ToolPak installed on your system. To do this in Excel 2003, check the Tools menu for menu item "Data Analysis". If missing, you need to install it as follows: go to Tools → Add-Ins and check "Analysis ToolPak". To do this in Excel 2007/2010, select the Data tab and see whether there is an "Analysis" group. If missing, you need to install it as follows: click the Microsoft Office Button, then click Excel Options, then click Add-ins, and then in the Manage box, select Excel Add-ins and click Go. In the Add-Ins available box, select the Analysis ToolPak check box, and then click OK.

Place your sample data for both parameter sets in two separate columns. In Excel 2003 select "Tools → Data Analysis" and then select "F-Test Two-Sample for Variances" to run the F-Test. In Excel 2007/2010 select "Data → Analysis → Data Analysis" and then select "F-Test Two-Sample for Variances" to run the F-Test. The result will look very professional in your report and give you a piece of important information, namely which two-tailed two-sample T-Test to employ: assuming equal variances or assuming unequal variances. There are four scenarios possible:

1. if  $|mean(Variable\ 1) - mean(Variable\ 2)| > t_{critical}$  and  $F < F\ Critical$ : assume equal variances

2. if  $|mean(Variable\ 1) - mean(Variable2)|$  and  $F > F\ Critical$ : assume unequal variances
3. if  $|mean(Variable\ 1) - mean(Variable2)|$  and  $F > F\ Critical$ : assume equal variances
4. if  $|mean(Variable\ 1) - mean(Variable2)|$  and  $F < F\ Critical$ : assume unequal variances

Again select “Tools → Data Analysis” in Excel 2003 or “Data → Analysis → Data Analysis” in Excel 2007/2010 and then select either “t-test Two-Sample Assuming Equal Variances” or “t-test Two-Sample Assuming Unequal Variances” according to the result of your F-Test. Specify Hypothesized Mean Difference to be zero and leave alpha at the default value of 0.05. If  $|t\ Stat| > |t\ Critical\ Two - Tail|$  then reject the null hypothesis that the hypothesized mean difference is zero and conclude that the variable with the better mean indicates a statistically better algorithm on this problem instance; otherwise accept.