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Differential Analysis of Microarray Data, Multiple Testing Problems and False Discovery Rate (FDR)

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Microarray (DNA chips) data is a new technology that measures the expression level of thousands of genes simultaneously. Many microarray experiment aim at detecting differentially expressed genes between two conditions. Because of the large number of genes, multiple testing problems immediately rise in the statistical analysis of these experiments. One of the crucial points is the control of the number of false positive genes. We present the general setting of differential analysis in microarray experiments and the multiple testing problem. We then introduce the recent developments about the false discovery rate and propose a new method, based on mixture models, to estimate it.