**Text S5: Test Statistics for Full and Reduced One-Locus Models**

The Wald test statistic is , where





The  rows of matrixrepresent the corresponding genotype for individual . And .

, and 



We recall that,, .

**For NOIA statistical model with no dominance component modeled,**

****



****

****

Then



**For NOIA statistical model with dominance component,**

****



****



Then we got the test statistic for the NOIA one-locus full model as follows:

.

**For usual functional model with no dominance component modeled,**

****



****





It results in the same test statistic as the NOIA model for the additive effect estimating.

**For usual functional model with dominance component modeled,**



****





From the second row of the matrix, we observe that the test statistic for the additive effect is different with those of the previous three models. And the test statistic z is usually smaller.