**Text S4: Orthogonality of the Func-POE models**

We also checked the variance decomposition of the Func-POE models before and after transformation.

 For the Func-POE model before transformation, as from formulation (A4),

, (D1)

where under HWE which we already showed previously in Text S2, and

,

.

Neither of above equations was equal to 0 even when the locus was under HWE.

 For the Func-POE model after transformation, as from formulation (10),

,(D2)

Where  is not equal to 0, and if it is under HWE. Then

. (D3)

 Therefore, even if the HWE assumption holds, the variance of the Func-POE models could not be expressed as the completely decomposed form as could the Stat-POE models, which confirms that the Func-POE models are not orthogonal.