1.Diplotype Model

a. Set the initial frequency parameter( , , , , , , , , and )is 1/9

b. Construct the likelihood function.

c. Obtain the optimal solution under maximum likelihood estimation through the solnp function.

d. Calculate the value of *,* ,*D***A**, *D***B**, Δ**ab**, *D***Ab**, *D***aB**, and Δ**AB**

2.Haplotype Data

a. Set the initial frequency parameter( , , and )is 1/4

b. Construct the likelihood function.

c. Obtain the optimal solution under maximum likelihood estimation through the solnp function.

d. Calculate the value of *,* ,*D***.**

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