# Métodos para identificar asociaciones entre genotipos y múltiples fenotipos
# Proyecto

Juan Pablo Acero Baena
**Directora:** Liliana López Kleine

2023

## Contents

**1 Anexos** **1**
1.1 Tabla de SNPs . . . 1
1.1.1 Peonidin . . . 2
1.1.2 Pelargonidin . . . 3
1.1.3 Delphinidin . . . 4
1.1.4 Cyanidin . . . 5
1.1.5 Petunidin . . . 6
1.2 Tablas SNPs Simulaciones . . . 7
1.2.1 Simulación 1 . . . 7
1.2.2 Simulación 2 . . . 7
1.2.3 Simulación 3 . . . 8
1.2.4 Simulación 4 . . . 9
1.2.5 Simulación 5 . . . 10
1.2.6 Simulación 6 . . . 11
1.2.7 Simulación 7 . . . 12
Indice

# 1 Anexos

## 1.1 Tabla de SNPs

A continuación se muestran las tablas de SNPs que corresponden con la investigación realizada por [**?**]; en este caso para cada tabla la columna prioridad denota la importancia de cada SNP en el presente estudio de acuerdo con el p-valor más bajo.

### 1.1.1 Peonidin

| | SNP | Prioridad | Position.x | chr | OT_Pval | p_OT_adjust |
|---|---|---|---|---|---|---|
| 12 | ST4.03ch10pos52004868.1 | 1 | 15169924.0 | 10 | 0.0000000 | 0.0000018 |
| 13 | ST4.03ch10pos52004940.1 | 8 | 55363311.0 | 10 | 0.0000000 | 0.0000018 |
| 14 | ST4.03ch10pos52261553.1 | 4 | 44648218.0 | 11 | 0.0000000 | 0.0000018 |
| 15 | ST4.03ch10pos52261573.1 | 3 | 55440583.0 | 10 | 0.0000000 | 0.0000018 |
| 5 | ST4.03ch02pos41058534.1 | 24 | 24472491.0 | 11 | 0.0000001 | 0.0000020 |
| 6 | ST4.03ch02pos41058575.1 | 25 | 41098800.0 | 10 | 0.0000001 | 0.0000020 |
| 17 | ST4.03ch10pos54778485.1 | 50 | 36607827.0 | 11 | 0.0000002 | 0.0000033 |
| 4 | ST4.03ch02pos41058521.1 | 67 | 29455991.0 | 12 | 0.0000003 | 0.0000034 |
| 10 | ST4.03ch04pos1900346.1 | 60 | 67131557.0 | 9 | 0.0000002 | 0.0000034 |
| 21 | ST4.03ch10pos55585530.1 | 82 | 44282344.0 | 11 | 0.0000003 | 0.0000038 |
| 19 | ST4.03ch10pos55086272.1 | 91 | 12690304.0 | 10 | 0.0000004 | 0.0000043 |
| 1 | ST4.03ch01pos65949446.1 | 93 | 326654.1 | 11 | 0.0000005 | 0.0000044 |
| 7 | ST4.03ch03pos35358169.1 | 100 | 58503003.0 | 9 | 0.0000005 | 0.0000045 |
| 8 | ST4.03ch03pos52420845.1 | 102 | 64500889.0 | 9 | 0.0000005 | 0.0000045 |
| 9 | ST4.03ch03pos52420887.1 | 103 | 11979763.0 | 11 | 0.0000005 | 0.0000045 |
| 11 | ST4.03ch07pos29604479.1 | 112 | 55502824.0 | 10 | 0.0000006 | 0.0000045 |
| 3 | ST4.03ch01pos72453001.1 | 113 | 45635497.0 | 11 | 0.0000006 | 0.0000045 |
| 18 | ST4.03ch10pos54838788.1 | 114 | 54062055.0 | 10 | 0.0000006 | 0.0000046 |
| 20 | ST4.03ch10pos55325863.1 | 152 | 49021726.0 | 10 | 0.0000010 | 0.0000056 |
| 2 | ST4.03ch01pos71231124.1 | 160 | 16264276.0 | 10 | 0.0000010 | 0.0000058 |
| 16 | ST4.03ch10pos54746624.1 | 222 | 67131538.0 | 9 | 0.0000019 | 0.0000077 |

### 1.1.2 Pelargonidin

| | SNP | Prioridad | Position.x | chr | OT_Pval | p_OT_adjust |
|---|---|---|---|---|---|---|
| 23 | ST4.03ch10pos52004868.1 | 1 | 15169924.0 | 10 | 0.0000000 | 0.0000018 |
| 24 | ST4.03ch10pos52004940.1 | 8 | 55363311.0 | 10 | 0.0000000 | 0.0000018 |
| 25 | ST4.03ch10pos52261553.1 | 4 | 44648218.0 | 11 | 0.0000000 | 0.0000018 |
| 26 | ST4.03ch10pos52261573.1 | 3 | 55440583.0 | 10 | 0.0000000 | 0.0000018 |
| 8 | ST4.03ch02pos41058534.1 | 24 | 24472491.0 | 11 | 0.0000001 | 0.0000020 |
| 9 | ST4.03ch02pos41058575.1 | 25 | 41098800.0 | 10 | 0.0000001 | 0.0000020 |
| 22 | ST4.03ch10pos51318001.1 | 32 | 431152.1 | 11 | 0.0000001 | 0.0000027 |
| 2 | ST4.03ch01pos6589444.1 | 38 | 56718308.0 | 12 | 0.0000001 | 0.0000030 |
| 39 | ST4.03ch10pos58750187.1 | 40 | 44905981.0 | 11 | 0.0000001 | 0.0000030 |
| 34 | ST4.03ch10pos57331136.1 | 41 | 50508083.0 | 12 | 0.0000001 | 0.0000031 |
| 31 | ST4.03ch10pos54778485.1 | 50 | 36607827.0 | 11 | 0.0000002 | 0.0000033 |
| 35 | ST4.03ch10pos57331157.1 | 42 | 56759530.0 | 12 | 0.0000002 | 0.0000033 |
| 4 | ST4.03ch01pos80750504.1 | 57 | 63988229.0 | 9 | 0.0000002 | 0.0000034 |
| 7 | ST4.03ch02pos41058521.1 | 67 | 29455991.0 | 12 | 0.0000003 | 0.0000034 |
| 13 | ST4.03ch04pos1900346.1 | 60 | 67131557.0 | 9 | 0.0000002 | 0.0000034 |
| 20 | ST4.03ch09pos52672220.1 | 70 | 20500500.0 | 12 | 0.0000003 | 0.0000034 |
| 27 | ST4.03ch10pos54207412.1 | 58 | 43513219.0 | 11 | 0.0000002 | 0.0000034 |
| 28 | ST4.03ch10pos54331241.1 | 72 | 59889217.0 | 10 | 0.0000003 | 0.0000034 |
| 14 | ST4.03ch04pos63358558.1 | 88 | 51983697.0 | 12 | 0.0000004 | 0.0000040 |
| 11 | ST4.03ch03pos57597957.1 | 90 | 44797644.0 | 11 | 0.0000004 | 0.0000042 |
| 10 | ST4.03ch03pos57597865.1 | 95 | 20513568.0 | 11 | 0.0000005 | 0.0000044 |
| 36 | ST4.03ch10pos58400594.1 | 97 | 30997211.0 | 10 | 0.0000005 | 0.0000044 |
| 37 | ST4.03ch10pos58748991.1 | 101 | 38029508.0 | 11 | 0.0000005 | 0.0000045 |
| 12 | ST4.03ch03pos57598037.1 | 111 | 38881424.0 | 10 | 0.0000006 | 0.0000045 |
| 15 | ST4.03ch06pos55057388.1 | 110 | 50920971.0 | 10 | 0.0000006 | 0.0000045 |
| 21 | ST4.03ch09pos52672228.1 | 105 | 43677898.0 | 11 | 0.0000005 | 0.0000045 |
| 29 | ST4.03ch10pos54331266.1 | 109 | 40773908.0 | 12 | 0.0000006 | 0.0000045 |
| 38 | ST4.03ch10pos58750162.1 | 104 | 43547421.0 | 12 | 0.0000005 | 0.0000045 |
| 32 | ST4.03ch10pos54838788.1 | 114 | 54062055.0 | 10 | 0.0000006 | 0.0000046 |
| 5 | ST4.03ch01pos81271286.1 | 120 | 35143652.0 | 12 | 0.0000006 | 0.0000047 |
| 16 | ST4.03ch06pos56822189.1 | 124 | 48669444.0 | 12 | 0.0000007 | 0.0000047 |
| 17 | ST4.03ch06pos56822224.1 | 125 | 38724668.0 | 11 | 0.0000007 | 0.0000047 |
| 18 | ST4.03ch06pos56822225.1 | 126 | 63225471.0 | 9 | 0.0000007 | 0.0000049 |
| 19 | ST4.03ch06pos56822258.1 | 127 | 22203396.0 | 12 | 0.0000007 | 0.0000050 |
| 3 | ST4.03ch01pos67522138.1 | 140 | 44431126.0 | 11 | 0.0000008 | 0.0000053 |
| 6 | ST4.03ch01pos81698537.1 | 138 | 63334971.0 | 9 | 0.0000008 | 0.0000053 |
| 1 | ST4.03ch01pos4060700.1 | 146 | 40773887.0 | 12 | 0.0000009 | 0.0000054 |
| 33 | ST4.03ch10pos55202878.1 | 145 | 46367189.0 | 11 | 0.0000009 | 0.0000054 |
| 30 | ST4.03ch10pos54746624.1 | 222 | 67131538.0 | 9 | 0.0000019 | 0.0000077 |

### 1.1.3 Delphinidin

| | SNP | Prioridad | Position.x | chr | OT_Pval | p_OT_adjust |
|---|---|---|---|---|---|---|
| 15 | ST4.03ch10pos52004868.1 | 1 | 15169924.0 | 10 | 0.0000000 | 0.0000018 |
| 16 | ST4.03ch10pos52004940.1 | 8 | 55363311.0 | 10 | 0.0000000 | 0.0000018 |
| 17 | ST4.03ch10pos52261553.1 | 4 | 44648218.0 | 11 | 0.0000000 | 0.0000018 |
| 18 | ST4.03ch10pos52261573.1 | 3 | 55440583.0 | 10 | 0.0000000 | 0.0000018 |
| 7 | ST4.03ch02pos41058534.1 | 24 | 24472491.0 | 11 | 0.0000001 | 0.0000020 |
| 2 | ST4.03ch01pos24135132.1 | 27 | 52323238.0 | 10 | 0.0000001 | 0.0000020 |
| 8 | ST4.03ch02pos41058575.1 | 25 | 41098800.0 | 10 | 0.0000001 | 0.0000020 |
| 21 | ST4.03ch10pos54778485.1 | 50 | 36607827.0 | 11 | 0.0000002 | 0.0000033 |
| 6 | ST4.03ch02pos41058521.1 | 67 | 29455991.0 | 12 | 0.0000003 | 0.0000034 |
| 3 | ST4.03ch01pos34616221.1 | 87 | 60166401.0 | 9 | 0.0000004 | 0.0000040 |
| 9 | ST4.03ch04pos1759501.1 | 89 | 25805987.0 | 12 | 0.0000004 | 0.0000040 |
| 22 | ST4.03ch10pos55086272.1 | 91 | 12690304.0 | 10 | 0.0000004 | 0.0000043 |
| 5 | ST4.03ch01pos72157331.1 | 108 | 45401866.0 | 11 | 0.0000006 | 0.0000045 |
| 14 | ST4.03ch10pos51906575.1 | 107 | 43536186.0 | 11 | 0.0000006 | 0.0000045 |
| 19 | ST4.03ch10pos54331266.1 | 109 | 40773908.0 | 12 | 0.0000006 | 0.0000045 |
| 4 | ST4.03ch01pos37666203.1 | 115 | 42212122.0 | 11 | 0.0000006 | 0.0000046 |
| 10 | ST4.03ch08pos42854758.1 | 116 | 34382987.0 | 10 | 0.0000006 | 0.0000046 |
| 1 | ST4.03ch01pos24135105.1 | 117 | 44111015.0 | 10 | 0.0000006 | 0.0000046 |
| 12 | ST4.03ch08pos51824077.1 | 122 | 66515441.0 | 9 | 0.0000007 | 0.0000047 |
| 13 | ST4.03ch08pos51824105.1 | 123 | 50940044.0 | 10 | 0.0000007 | 0.0000047 |
| 11 | ST4.03ch08pos51824048.1 | 141 | 58099220.0 | 9 | 0.0000008 | 0.0000053 |
| 20 | ST4.03ch10pos54746624.1 | 222 | 67131538.0 | 9 | 0.0000019 | 0.0000077 |

### 1.1.4 Cyanidin

| | SNP | Prioridad | Position.x | chr | OT_Pval | p_OT_adjust |
|---|---|---|---|---|---|---|
| 9 | ST4.03ch06pos8156658.1 | 16 | 45041717.0 | 11 | 0.0000000 | 0.0000018 |
| 12 | ST4.03ch06pos8156693.1 | 19 | 25089338.0 | 12 | 0.0000000 | 0.0000018 |
| 22 | ST4.03ch10pos52004429.1 | 14 | 40364202.0 | 11 | 0.0000000 | 0.0000018 |
| 24 | ST4.03ch10pos52004868.1 | 1 | 15169924.0 | 10 | 0.0000000 | 0.0000018 |
| 25 | ST4.03ch10pos52004940.1 | 8 | 55363311.0 | 10 | 0.0000000 | 0.0000018 |
| 26 | ST4.03ch10pos52261553.1 | 4 | 44648218.0 | 11 | 0.0000000 | 0.0000018 |
| 21 | ST4.03ch10pos52004393.1 | 34 | 44324168.0 | 11 | 0.0000001 | 0.0000027 |
| 29 | ST4.03ch11pos39802173.1 | 33 | 59327487.0 | 10 | 0.0000001 | 0.0000027 |
| 4 | ST4.03ch01pos62416352.1 | 39 | 54413534.0 | 9 | 0.0000001 | 0.0000030 |
| 10 | ST4.03ch06pos8156659.1 | 45 | 46660920.0 | 11 | 0.0000002 | 0.0000033 |
| 11 | ST4.03ch06pos8156687.1 | 46 | 42733249.0 | 11 | 0.0000002 | 0.0000033 |
| 13 | ST4.03ch06pos8156696.1 | 48 | 51477462.0 | 9 | 0.0000002 | 0.0000033 |
| 28 | ST4.03ch10pos54778485.1 | 50 | 36607827.0 | 11 | 0.0000002 | 0.0000033 |
| 2 | ST4.03ch01pos59492484.1 | 75 | 54499741.0 | 10 | 0.0000003 | 0.0000034 |
| 14 | ST4.03ch08pos19870006.1 | 78 | 11145377.0 | 12 | 0.0000003 | 0.0000034 |
| 19 | ST4.03ch09pos59749919.1 | 79 | 46622022.0 | 11 | 0.0000003 | 0.0000034 |
| 3 | ST4.03ch01pos59492506.1 | 81 | 45635449.0 | 11 | 0.0000003 | 0.0000038 |
| 20 | ST4.03ch09pos59749949.1 | 80 | 41098763.0 | 10 | 0.0000003 | 0.0000038 |
| 31 | ST4.03ch12pos59205719.1 | 83 | 55749031.0 | 10 | 0.0000003 | 0.0000038 |
| 18 | ST4.03ch08pos6515498.1 | 92 | 53051444.0 | 12 | 0.0000004 | 0.0000043 |
| 5 | ST4.03ch02pos26928841.1 | 94 | 55751429.0 | 10 | 0.0000005 | 0.0000044 |
| 8 | ST4.03ch05pos6829151.1 | 96 | 59486502.0 | 9 | 0.0000005 | 0.0000044 |
| 6 | ST4.03ch03pos52420845.1 | 102 | 64500889.0 | 9 | 0.0000005 | 0.0000045 |
| 7 | ST4.03ch03pos52420887.1 | 103 | 11979763.0 | 11 | 0.0000005 | 0.0000045 |
| 16 | ST4.03ch08pos51824077.1 | 122 | 66515441.0 | 9 | 0.0000007 | 0.0000047 |
| 17 | ST4.03ch08pos51824105.1 | 123 | 50940044.0 | 10 | 0.0000007 | 0.0000047 |
| 15 | ST4.03ch08pos51824048.1 | 141 | 58099220.0 | 9 | 0.0000008 | 0.0000053 |
| 32 | ST4.03ch12pos59564741.1 | 147 | 56559623.0 | 12 | 0.0000009 | 0.0000055 |
| 33 | ST4.03ch12pos59564742.1 | 148 | 30073909.0 | 10 | 0.0000009 | 0.0000055 |
| 30 | ST4.03ch12pos5646646.1 | 151 | 18675401.0 | 10 | 0.0000010 | 0.0000056 |
| 23 | ST4.03ch10pos52004438.1 | 221 | 41723427.0 | 11 | 0.0000019 | 0.0000076 |
| 27 | ST4.03ch10pos54746624.1 | 222 | 67131538.0 | 9 | 0.0000019 | 0.0000077 |
| 1 | ST4.03ch01pos59492465.1 | 265 | 41723453.0 | 11 | 0.0000028 | 0.0000094 |

### 1.1.5 Petunidin

| | SNP | Prioridad | Position.x | chr | OT_Pval | p_OT_adjust |
|---|---|---|---|---|---|---|
| 7 | ST4.03ch01pos72364545.1 | 21 | 64796847.0 | 9 | 0.0000000 | 0.0000018 |
| 17 | ST4.03ch06pos8156658.1 | 16 | 45041717.0 | 11 | 0.0000000 | 0.0000018 |
| 20 | ST4.03ch06pos8156693.1 | 19 | 25089338.0 | 12 | 0.0000000 | 0.0000018 |
| 25 | ST4.03ch10pos52004868.1 | 1 | 15169924.0 | 10 | 0.0000000 | 0.0000018 |
| 26 | ST4.03ch10pos52004940.1 | 8 | 55363311.0 | 10 | 0.0000000 | 0.0000018 |
| 2 | ST4.03ch01pos24135132.1 | 27 | 52323238.0 | 10 | 0.0000001 | 0.0000020 |
| 27 | ST4.03ch11pos3129502.1 | 31 | 34548063.0 | 12 | 0.0000001 | 0.0000027 |
| 5 | ST4.03ch01pos53094258.1 | 36 | 54295240.0 | 10 | 0.0000001 | 0.0000029 |
| 6 | ST4.03ch01pos53094259.1 | 37 | 44342669.0 | 11 | 0.0000001 | 0.0000030 |
| 3 | ST4.03ch01pos28299633.1 | 49 | 44484478.0 | 11 | 0.0000002 | 0.0000033 |
| 13 | ST4.03ch04pos34994900.1 | 51 | 29671070.0 | 12 | 0.0000002 | 0.0000033 |
| 14 | ST4.03ch04pos34994901.1 | 52 | 26290481.0 | 10 | 0.0000002 | 0.0000033 |
| 18 | ST4.03ch06pos8156659.1 | 45 | 46660920.0 | 11 | 0.0000002 | 0.0000033 |
| 19 | ST4.03ch06pos8156687.1 | 46 | 42733249.0 | 11 | 0.0000002 | 0.0000033 |
| 21 | ST4.03ch06pos8156696.1 | 48 | 51477462.0 | 9 | 0.0000002 | 0.0000033 |
| 33 | ST4.03ch12pos24259182.1 | 43 | 15351869.0 | 10 | 0.0000002 | 0.0000033 |
| 15 | ST4.03ch04pos34994967.1 | 53 | 56616369.0 | 12 | 0.0000002 | 0.0000034 |
| 4 | ST4.03ch01pos41189272.1 | 59 | 22203376.0 | 12 | 0.0000002 | 0.0000034 |
| 8 | ST4.03ch02pos48517142.1 | 65 | 54295245.0 | 10 | 0.0000003 | 0.0000034 |
| 10 | ST4.03ch02pos48517205.1 | 66 | 45060384.0 | 10 | 0.0000003 | 0.0000034 |
| 28 | ST4.03ch11pos33265607.1 | 76 | 25089314.0 | 12 | 0.0000003 | 0.0000034 |
| 29 | ST4.03ch11pos40000556.1 | 73 | 431126.1 | 11 | 0.0000003 | 0.0000034 |
| 30 | ST4.03ch11pos40000591.1 | 85 | 50508087.0 | 12 | 0.0000004 | 0.0000040 |
| 32 | ST4.03ch11pos9222771.1 | 98 | 57788618.0 | 10 | 0.0000005 | 0.0000045 |
| 9 | ST4.03ch02pos48517152.1 | 106 | 43513210.0 | 11 | 0.0000006 | 0.0000045 |
| 1 | ST4.03ch01pos24135105.1 | 117 | 44111015.0 | 10 | 0.0000006 | 0.0000046 |
| 23 | ST4.03ch08pos51824077.1 | 122 | 66515441.0 | 9 | 0.0000007 | 0.0000047 |
| 24 | ST4.03ch08pos51824105.1 | 123 | 50940044.0 | 10 | 0.0000007 | 0.0000047 |
| 16 | ST4.03ch06pos34132353.1 | 139 | 56559559.0 | 12 | 0.0000008 | 0.0000053 |
| 22 | ST4.03ch08pos51824048.1 | 141 | 58099220.0 | 9 | 0.0000008 | 0.0000053 |
| 31 | ST4.03ch11pos8968223.1 | 144 | 41098771.0 | 10 | 0.0000009 | 0.0000054 |
| 12 | ST4.03ch03pos47396847.1 | 150 | 63461516.0 | 9 | 0.0000009 | 0.0000055 |
| 11 | ST4.03ch03pos47396782.1 | 809 | 20513613.0 | 11 | 0.0001061 | 0.0001177 |

## 1.2 Tablas SNPs Simulaciones

### 1.2.1 Simulación 1

| SNP | ET_Pval | OT_Pval | AT_Pval_min |
|---|---|---|---|
| 7 | 0.007692 | 2.61E-13 | 4.43E-12 |
| 4 | 0.008638 | 4.64E-11 | 7.91E-12 |
| 5 | 0.009506 | 4.3E-11 | 1.28E-11 |
| 6 | 0.010021 | 5.91E-11 | 1.66E-11 |
| 8 | 0.012596 | 1.04E-10 | 5.22E-11 |
| 9 | 0.014671 | 4.22E-10 | 1.12E-10 |
| 10 | 0.015217 | 3.77E-10 | 1.34E-10 |
| 11 | 0.016062 | 7.87E-10 | 1.76E-10 |
| 12 | 0.016865 | 6.37E-10 | 2.24E-10 |
| 13 | 0.018846 | 9.68E-10 | 3.91E-10 |
| 3 | 0.022003 | 3.47E-08 | 8.49E-10 |
| 2 | 0.022498 | 4.37E-08 | 9.48E-10 |
| 1 | 0.02416 | 8.44E-08 | 1.35E-09 |

### 1.2.2 Simulación 2

| SNP | ET_Pval | OT_Pval | AT_Pval_min |
|---|---|---|---|
| 7 | 0.007183 | 4.71E-11 | 3.15E-12 |
| 6 | 0.007484 | 7.76E-11 | 3.86E-12 |
| 9 | 0.007913 | 9.01E-11 | 5.1E-12 |
| 10 | 0.008533 | 9.32E-11 | 7.44E-12 |
| 14 | 0.011008 | 3.42E-10 | 2.66E-11 |
| 12 | 0.011199 | 9.99E-10 | 2.9E-11 |
| 11 | 0.011525 | 8.78E-10 | 3.35E-11 |
| 8 | 0.011537 | 2.06E-09 | 3.36E-11 |
| 13 | 0.012045 | 9.44E-10 | 4.17E-11 |
| 16 | 0.012388 | 1.21E-09 | 4.8E-11 |
| 17 | 0.013904 | 1.96E-09 | 8.55E-11 |
| 15 | 0.014333 | 3.17E-09 | 9.95E-11 |
| 19 | 0.014492 | 2.91E-09 | 1.05E-10 |
| 18 | 0.014548 | 2.07E-09 | 1.07E-10 |
| 20 | 0.015324 | 2.42E-09 | 1.39E-10 |
| 2 | 0.017019 | 3.01E-08 | 2.35E-10 |
| 1 | 0.017089 | 2.99E-08 | 2.4E-10 |
| 5 | 0.01732 | 3.45E-08 | 2.56E-10 |
| 3 | 0.01758 | 4.01E-08 | 2.76E-10 |
| 4 | 0.017682 | 3.9E-08 | 2.84E-10 |

### 1.2.3 Simulación 3

| SNP | ET_Pval | OT_Pval | AT_Pval_min |
|---|---|---|---|
| 10 | 0.010652 | 6.8E-10 | 2.26E-11 |
| 11 | 0.011633 | 1.34E-09 | 3.5E-11 |
| 8 | 0.011802 | 2.09E-09 | 3.77E-11 |
| 17 | 0.012573 | 1.48E-09 | 5.17E-11 |
| 14 | 0.012736 | 1.85E-09 | 5.51E-11 |
| 9 | 0.012812 | 2.96E-09 | 5.68E-11 |
| 18 | 0.013723 | 3.24E-09 | 8.01E-11 |
| 15 | 0.01415 | 5.2E-09 | 9.33E-11 |
| 19 | 0.014206 | 3.23E-09 | 9.52E-11 |
| 12 | 0.014808 | 7.93E-09 | 1.17E-10 |
| 22 | 0.015749 | 7.28E-09 | 1.59E-10 |
| 20 | 0.015878 | 8.04E-09 | 1.66E-10 |
| 2 | 0.016611 | 2.25E-08 | 2.08E-10 |
| 13 | 0.016738 | 1.74E-08 | 2.16E-10 |
| 23 | 0.017682 | 1.53E-08 | 2.84E-10 |
| 16 | 0.018347 | 2.71E-08 | 3.42E-10 |
| 21 | 0.018684 | 2.42E-08 | 3.75E-10 |
| 24 | 0.018695 | 1.57E-08 | 3.76E-10 |
| 25 | 0.018832 | 1.77E-08 | 3.9E-10 |
| 26 | 0.018912 | 1.84E-08 | 3.98E-10 |
| 27 | 0.019825 | 2.29E-08 | 5.04E-10 |
| 1 | 0.019885 | 6.76E-08 | 5.12E-10 |
| 7 | 0.020658 | 8.22E-08 | 6.19E-10 |
| 3 | 0.021323 | 7.86E-08 | 7.25E-10 |
| 4 | 0.021932 | 1.11E-07 | 8.35E-10 |
| 6 | 0.022333 | 1.33E-07 | 9.14E-10 |
| 5 | 0.022584 | 1.32E-07 | 9.67E-10 |

### 1.2.4 Simulación 4

| SNP | ET_Pval | OT_Pval | AT_Pval_min |
|---|---|---|---|
| 15 | 0.01097 | 2.99E-10 | 2.61E-11 |
| 11 | 0.01561 | 4.92E-09 | 1.52E-10 |
| 10 | 0.016939 | 7.79E-09 | 2.29E-10 |
| 14 | 0.017148 | 8.3E-09 | 2.44E-10 |
| 12 | 0.025607 | 1.47E-07 | 1.81E-09 |
| 20 | 0.026723 | 1.52E-07 | 2.24E-09 |
| 16 | 0.027568 | 1.91E-07 | 2.62E-09 |
| 18 | 0.028726 | 2.3E-07 | 3.22E-09 |
| 17 | 0.028932 | 2.82E-07 | 3.34E-09 |
| 30 | 0.02935 | 2.06E-07 | 3.59E-09 |
| 19 | 0.02974 | 3.1E-07 | 3.83E-09 |
| 33 | 0.030238 | 2.17E-07 | 4.16E-09 |
| 24 | 0.030373 | 3.06E-07 | 4.26E-09 |
| 25 | 0.03067 | 3.51E-07 | 4.47E-09 |
| 13 | 0.030996 | 4.66E-07 | 4.71E-09 |
| 29 | 0.031144 | 3.09E-07 | 4.82E-09 |
| 27 | 0.031356 | 3.54E-07 | 4.99E-09 |

| SNP | ET_Pval | OT_Pval | AT_Pval_min |
|---|---|---|---|
| 28 | 0.03157 | 3.66E-07 | 5.16E-09 |
| 32 | 0.031898 | 3.42E-07 | 5.44E-09 |
| 6 | 0.031931 | 5.9E-07 | 5.46E-09 |
| 31 | 0.031952 | 3.39E-07 | 5.48E-09 |
| 34 | 0.03219 | 3.34E-07 | 5.69E-09 |
| 21 | 0.032505 | 5.28E-07 | 5.97E-09 |
| 3 | 0.032506 | 6.81E-07 | 5.97E-09 |
| 26 | 0.032843 | 4.88E-07 | 6.29E-09 |
| 22 | 0.0334 | 6.17E-07 | 6.84E-09 |
| 8 | 0.033948 | 8.72E-07 | 7.42E-09 |
| 23 | 0.035369 | 8.92E-07 | 9.11E-09 |
| 4 | 0.035702 | 1.17E-06 | 9.55E-09 |
| 9 | 0.039442 | 1.83E-06 | 1.57E-08 |
| 7 | 0.039645 | 2.22E-06 | 1.61E-08 |
| 1 | 0.040371 | 2.5E-06 | 1.77E-08 |
| 2 | 0.048175 | 7.59E-06 | 4.28E-08 |
| 5 | 0.048259 | 8.08E-06 | 4.31E-08 |

### 1.2.5 Simulación 5

| SNP | ET_Pval | OT_Pval | AT_Pval_min |
|---|---|---|---|
| 20 | 0.00063 | 1.72E-15 | 1.62635E-17 |
| 21 | 0.000696 | 7.91E-16 | 2.69142E-17 |
| 22 | 0.007738 | 5.08E-10 | 4.56439E-12 |
| 19 | 0.022245 | 5.82E-08 | 8.96278E-10 |
| 17 | 0.03502 | 1.05E-06 | 8.67191E-09 |
| 26 | 0.045186 | 7.76E-06 | 3.10322E-08 |
| 15 | 0.051923 | 1.19E-05 | 6.22033E-08 |
| 28 | 0.069603 | 6.76E-05 | 2.69695E-07 |
| 27 | 0.079906 | 0.000157 | 5.38439E-07 |
| 40 | 0.100962 | 0.000604 | 1.73884E-06 |
| 24 | 0.10502 | 0.000797 | 2.11889E-06 |
| 52 | 0.12509 | 0.002049 | 5.09775E-06 |
| 33 | 0.156163 | 0.007638 | 1.55607E-05 |
| 47 | 0.160731 | 0.008681 | 1.79936E-05 |
| 43 | 0.191957 | 0.023091 | 4.40853E-05 |
| 23 | 0.238282 | 0.070818 | 0.00013196 |
| 34 | 0.257389 | 0.101209 | 0.000195502 |
| 48 | 0.269974 | 0.124289 | 0.000249504 |
| 45 | 0.291423 | 0.17443 | 0.000369183 |
| 29 | 0.293779 | 0.182472 | 0.000384767 |
| 4 | 0.298817 | 0.197165 | 0.000419913 |
| 5 | 0.306497 | 0.218978 | 0.0004785 |
| 16 | 0.310947 | 0.232088 | 0.000515396 |
| 53 | 0.313017 | 0.232226 | 0.000533335 |
| 54 | 0.313156 | 0.232607 | 0.000534556 |
| 42 | 0.314062 | 0.237924 | 0.000542579 |
| 8 | 0.322675 | 0.267982 | 0.000623936 |

| SNP | ET_Pval | OT_Pval | AT_Pval_min |
|---|---|---|---|
| 50 | 0.327274 | 0.277419 | 0.000671311 |
| 39 | 0.331086 | 0.292123 | 0.000712781 |
| 25 | 0.333322 | 0.30144 | 0.000738065 |
| 38 | 0.334091 | 0.302082 | 0.000746923 |
| 13 | 0.336746 | 0.314093 | 0.000778208 |
| 36 | 0.349803 | 0.356551 | 0.000948173 |
| 44 | 0.358346 | 0.385229 | 0.001075097 |
| 35 | 0.359106 | 0.389621 | 0.001087027 |
| 51 | 0.359605 | 0.388465 | 0.001094927 |
| 10 | 0.36659 | 0.420522 | 0.001210545 |
| 49 | 0.36753 | 0.417789 | 0.001226858 |
| 46 | 0.375145 | 0.446151 | 0.001365729 |
| 30 | 0.40219 | 0.549798 | 0.00196881 |
| 41 | 0.405754 | 0.560861 | 0.002062626 |
| 11 | 0.411717 | 0.586158 | 0.002227952 |
| 37 | 0.418352 | 0.607284 | 0.002424761 |
| 3 | 0.433765 | 0.663358 | 0.002938666 |
| 31 | 0.442103 | 0.689683 | 0.003252791 |
| 32 | 0.44338 | 0.693978 | 0.003303299 |
| 6 | 0.499288 | 0.848904 | 0.006270473 |
| 1 | 0.504042 | 0.859079 | 0.006603586 |
| 9 | 0.508055 | 0.867659 | 0.006896493 |
| 18 | 0.508232 | 0.867953 | 0.006909687 |
| 14 | 0.528055 | 0.904074 | 0.008528365 |
| 2 | 0.530859 | 0.908566 | 0.008781803 |
| 7 | 0.570017 | 0.956338 | 0.013067812 |
| 12 | 0.596651 | 0.97592 | 0.016939282 |

### 1.2.6 Simulación 6

| SNP | ET_Pval | OT_Pval | AT_Pval_min |
|---|---|---|---|
| 13 | 0.010681 | 7.26E-10 | 2.28652E-11 |
| 26 | 0.015217 | 6.85E-09 | 1.34239E-10 |
| 34 | 0.015555 | 7.58E-09 | 1.49801E-10 |
| 23 | 0.016441 | 1.15E-08 | 1.97616E-10 |
| 14 | 0.017089 | 1.52E-08 | 2.39778E-10 |
| 19 | 0.017484 | 1.75E-08 | 2.68807E-10 |
| 54 | 0.017539 | 1.49E-08 | 2.73104E-10 |
| 22 | 0.017605 | 1.81E-08 | 2.78277E-10 |
| 49 | 0.017902 | 1.77E-08 | 3.02542E-10 |
| 46 | 0.017989 | 1.88E-08 | 3.09909E-10 |
| 32 | 0.0183 | 2.26E-08 | 3.37723E-10 |
| 18 | 0.018547 | 2.51E-08 | 3.61088E-10 |
| 28 | 0.018931 | 2.79E-08 | 4.0002E-10 |
| 55 | 0.019476 | 2.99E-08 | 4.61089E-10 |
| 44 | 0.019513 | 3.12E-08 | 4.65446E-10 |
| 27 | 0.01958 | 3.5E-08 | 4.7352E-10 |
| 37 | 0.019843 | 3.73E-08 | 5.06198E-10 |
| 39 | 0.020004 | 3.81E-08 | 5.27096E-10 |
| 58 | 0.020522 | 4.21E-08 | 5.98889E-10 |
| 57 | 0.020608 | 4.26E-08 | 6.11658E-10 |
| 33 | 0.020653 | 4.72E-08 | 6.18352E-10 |
| 15 | 0.020736 | 5.24E-08 | 6.30865E-10 |
| 11 | 0.020967 | 5.69E-08 | 6.66755E-10 |
| 31 | 0.021368 | 5.87E-08 | 7.33062E-10 |
| 48 | 0.021582 | 6.07E-08 | 7.70488E-10 |
| 21 | 0.021941 | 7.22E-08 | 8.36679E-10 |
| 35 | 0.022119 | 7.22E-08 | 8.71208E-10 |
| 47 | 0.022194 | 7.09E-08 | 8.86114E-10 |
| 17 | 0.022389 | 8.33E-08 | 9.25702E-10 |
| 29 | 0.022703 | 8.65E-08 | 9.92433E-10 |
| 52 | 0.022757 | 8.08E-08 | 1.00434E-09 |
| 12 | 0.02278 | 9.22E-08 | 1.00939E-09 |
| 40 | 0.023045 | 9.44E-08 | 1.06967E-09 |
| 36 | 0.023051 | 9.41E-08 | 1.07104E-09 |
| 43 | 0.023259 | 9.71E-08 | 1.12012E-09 |
| 42 | 0.023506 | 1.03E-07 | 1.1808E-09 |
| 59 | 0.023734 | 1.04E-07 | 1.23935E-09 |
| 38 | 0.023987 | 1.2E-07 | 1.30683E-09 |
| 69 | 0.02423 | 1.13E-07 | 1.37443E-09 |
| 24 | 0.024441 | 1.41E-07 | 1.43528E-09 |
| 16 | 0.02446 | 1.46E-07 | 1.44097E-09 |
| 41 | 0.024523 | 1.36E-07 | 1.45967E-09 |
| 64 | 0.024563 | 1.27E-07 | 1.47153E-09 |
| 45 | 0.024862 | 1.47E-07 | 1.56324E-09 |
| 75 | 0.024923 | 1.34E-07 | 1.58249E-09 |
| 20 | 0.024946 | 1.61E-07 | 1.58988E-09 |
| 60 | 0.025114 | 1.5E-07 | 1.64418E-09 |
| 30 | 0.025123 | 1.64E-07 | 1.647E-09 |
| 56 | 0.025361 | 1.59E-07 | 1.72664E-09 |
| 61 | 0.025484 | 1.63E-07 | 1.76896E-09 |
| 65 | 0.025526 | 1.62E-07 | 1.78362E-09 |
| 51 | 0.026004 | 1.93E-07 | 1.95678E-09 |
| 25 | 0.026112 | 2.13E-07 | 1.99802E-09 |
| 78 | 0.026243 | 1.86E-07 | 2.04837E-09 |
| 84 | 0.026744 | 2E-07 | 2.25156E-09 |
| 86 | 0.026887 | 2.05E-07 | 2.31267E-09 |
| 53 | 0.027041 | 2.45E-07 | 2.3794E-09 |
| 50 | 0.027176 | 2.56E-07 | 2.43943E-09 |
| 88 | 0.027659 | 2.45E-07 | 2.66446E-09 |
| 62 | 0.027664 | 2.76E-07 | 2.66651E-09 |
| 95 | 0.027715 | 2.41E-07 | 2.69134E-09 |
| 70 | 0.028013 | 2.89E-07 | 2.83912E-09 |
| 74 | 0.028175 | 2.98E-07 | 2.92241E-09 |
| 99 | 0.028189 | 2.61E-07 | 2.92965E-09 |
| 83 | 0.028241 | 2.87E-07 | 2.95674E-09 |
| 96 | 0.028367 | 2.75E-07 | 3.02331E-09 |
| 91 | 0.028368 | 2.86E-07 | 3.02405E-09 |
| 67 | 0.028448 | 3.22E-07 | 3.06652E-09 |
| 71 | 0.028512 | 3.19E-07 | 3.10126E-09 |
| 76 | 0.028596 | 3.23E-07 | 3.14742E-09 |
| 63 | 0.028711 | 3.47E-07 | 3.21112E-09 |
| 85 | 0.028781 | 3.2E-07 | 3.25038E-09 |
| 81 | 0.028878 | 3.33E-07 | 3.30575E-09 |
| 82 | 0.028964 | 3.39E-07 | 3.35516E-09 |
| 98 | 0.029072 | 3.2E-07 | 3.41846E-09 |
| 94 | 0.029147 | 3.32E-07 | 3.46253E-09 |
| 89 | 0.029155 | 3.43E-07 | 3.46725E-09 |
| 90 | 0.029243 | 3.46E-07 | 3.51978E-09 |
| 72 | 0.029345 | 3.82E-07 | 3.58204E-09 |
| 80 | 0.029393 | 3.76E-07 | 3.61136E-09 |
| 77 | 0.029429 | 3.85E-07 | 3.63353E-09 |
| 93 | 0.029589 | 3.69E-07 | 3.73323E-09 |
| 97 | 0.029634 | 3.7E-07 | 3.76185E-09 |
| 100 | 0.029696 | 3.62E-07 | 3.80131E-09 |
| 92 | 0.029745 | 3.83E-07 | 3.83276E-09 |
| 79 | 0.029907 | 4.25E-07 | 3.9381E-09 |
| 87 | 0.030106 | 4.29E-07 | 4.07107E-09 |
| 73 | 0.030689 | 5.09E-07 | 4.48071E-09 |
| 68 | 0.030872 | 5.41E-07 | 4.61637E-09 |
| 1 | 0.030965 | 6.26E-07 | 4.68595E-09 |
| 66 | 0.031539 | 6.21E-07 | 5.1368E-09 |
| 10 | 0.033273 | 9.62E-07 | 6.71395E-09 |
| 9 | 0.035228 | 1.37E-06 | 8.93265E-09 |
| 7 | 0.035994 | 1.55E-06 | 9.94707E-09 |
| 4 | 0.036496 | 1.62E-06 | 1.06612E-08 |
| 5 | 0.038338 | 2.35E-06 | 1.36394E-08 |
| 3 | 0.038359 | 2.36E-06 | 1.36761E-08 |
| 8 | 0.038625 | 2.43E-06 | 1.41579E-08 |
| 6 | 0.040619 | 3.28E-06 | 1.82102E-08 |
| 2 | 0.042064 | 4.17E-06 | 2.16903E-08 |

### 1.2.7 Simulación 7

| SNP | ET_Pval | OT_Pval | AT_Pval_min |
|---|---|---|---|
| 79 | 0.00585 | 6.29E-12 | 1.13E-12 |
| 37 | 0.017191 | 2.21E-08 | 2.47E-10 |
| 119 | 0.021673 | 9.73E-08 | 7.87E-10 |
| 91 | 0.021731 | 9.4E-08 | 7.97E-10 |
| 67 | 0.027745 | 3.61E-07 | 2.71E-09 |
| 45 | 0.030183 | 3.95E-07 | 4.12E-09 |
| 96 | 0.033762 | 7.29E-07 | 7.22E-09 |
| 97 | 0.036569 | 1.84E-06 | 1.08E-08 |
| 44 | 0.037123 | 1.4E-06 | 1.16E-08 |
| 40 | 0.038719 | 1.82E-06 | 1.43E-08 |
| 68 | 0.039776 | 2.08E-06 | 1.64E-08 |
| 94 | 0.040108 | 2.13E-06 | 1.71E-08 |
| 42 | 0.041348 | 2.7E-06 | 1.99E-08 |
| 50 | 0.050469 | 1.14E-05 | 5.4E-08 |
| 54 | 0.061657 | 3.69E-05 | 1.47E-07 |
| 82 | 0.06873 | 5.72E-05 | 2.53E-07 |
| 52 | 0.079775 | 0.000142 | 5.34E-07 |
| 26 | 0.081339 | 0.000161 | 5.89E-07 |
| 24 | 0.089921 | 0.000292 | 9.73E-07 |
| 98 | 0.094441 | 0.000377 | 1.24E-06 |
| 69 | 0.101404 | 0.000581 | 1.78E-06 |
| 93 | 0.103276 | 0.00064 | 1.95E-06 |
| 19 | 0.10462 | 0.000711 | 2.08E-06 |
| 118 | 0.108437 | 0.000843 | 2.49E-06 |
| 18 | 0.109677 | 0.000936 | 2.63E-06 |
| 140 | 0.122156 | 0.001661 | 4.52E-06 |
| 58 | 0.123548 | 0.001836 | 4.79E-06 |
| 60 | 0.125045 | 0.001966 | 5.09E-06 |
| 56 | 0.133075 | 0.002813 | 6.96E-06 |
| 81 | 0.133897 | 0.002886 | 7.18E-06 |
| 105 | 0.138033 | 0.003405 | 8.36E-06 |
| 78 | 0.141114 | 0.003895 | 9.34E-06 |
| 27 | 0.142912 | 0.004238 | 9.96E-06 |
| 126 | 0.152931 | 0.006021 | 1.4E-05 |
| 71 | 0.156123 | 0.006873 | 1.55E-05 |
| 43 | 0.162148 | 0.008525 | 1.88E-05 |
| 22 | 0.163105 | 0.008848 | 1.94E-05 |
| 66 | 0.173223 | 0.012159 | 2.62E-05 |
| 116 | 0.173915 | 0.01229 | 2.68E-05 |
| 88 | 0.174886 | 0.012757 | 2.75E-05 |
| 142 | 0.175232 | 0.012684 | 2.78E-05 |
| 89 | 0.176695 | 0.013483 | 2.9E-05 |
| 87 | 0.177219 | 0.013709 | 2.94E-05 |
| 41 | 0.177438 | 0.013955 | 2.96E-05 |
| 39 | 0.17999 | 0.015051 | 3.18E-05 |
| 16 | 0.182807 | 0.016446 | 3.44E-05 |
| 36 | 0.185432 | 0.017684 | 3.7E-05 |
| 59 | 0.186932 | 0.018371 | 3.86E-05 |
| 106 | 0.189794 | 0.019732 | 4.16E-05 |
| 35 | 0.192574 | 0.02158 | 4.48E-05 |
| 131 | 0.201252 | 0.026702 | 5.6E-05 |
| 127 | 0.207313 | 0.031179 | 6.51E-05 |
| 100 | 0.207469 | 0.031515 | 6.53E-05 |
| 74 | 0.209307 | 0.033152 | 6.83E-05 |
| 51 | 0.209849 | 0.03372 | 6.92E-05 |
| 73 | 0.212365 | 0.035697 | 7.35E-05 |
| 48 | 0.214038 | 0.037302 | 7.65E-05 |
| 149 | 0.218339 | 0.04043 | 8.46E-05 |
| 117 | 0.226192 | 0.048734 | 0.000101 |
| 146 | 0.226637 | 0.048876 | 0.000102 |
| 144 | 0.227431 | 0.049775 | 0.000104 |
| 20 | 0.231976 | 0.056025 | 0.000115 |
| 138 | 0.239531 | 0.064403 | 0.000136 |
| 85 | 0.24022 | 0.066006 | 0.000138 |
| 84 | 0.241091 | 0.067213 | 0.00014 |
| 83 | 0.243786 | 0.070805 | 0.000148 |
| 80 | 0.250257 | 0.08043 | 0.000169 |
| 130 | 0.252843 | 0.083716 | 0.000179 |
| 34 | 0.253479 | 0.085885 | 0.000181 |
| 33 | 0.257882 | 0.093136 | 0.000197 |
| 2 | 0.258358 | 0.094128 | 0.000199 |
| 55 | 0.259383 | 0.095437 | 0.000203 |
| 53 | 0.261536 | 0.0992 | 0.000212 |
| 76 | 0.264316 | 0.103962 | 0.000224 |
| 124 | 0.266759 | 0.107681 | 0.000235 |
| 32 | 0.268128 | 0.111624 | 0.000241 |
| 28 | 0.269015 | 0.113321 | 0.000245 |
| 72 | 0.269386 | 0.11344 | 0.000247 |
| 95 | 0.27008 | 0.114372 | 0.00025 |
| 150 | 0.272591 | 0.118298 | 0.000262 |
| 29 | 0.273564 | 0.122096 | 0.000267 |
| 114 | 0.285456 | 0.146249 | 0.000332 |
| 115 | 0.287818 | 0.151613 | 0.000346 |
| 141 | 0.288642 | 0.15288 | 0.000351 |
| 113 | 0.290029 | 0.156784 | 0.00036 |
| 63 | 0.290581 | 0.158947 | 0.000364 |
| 62 | 0.293811 | 0.166621 | 0.000385 |
| 109 | 0.296108 | 0.1715 | 0.000401 |
| 21 | 0.297527 | 0.176451 | 0.000411 |
| 61 | 0.298528 | 0.178414 | 0.000418 |
| 152 | 0.307041 | 0.198407 | 0.000483 |
| 104 | 0.307849 | 0.201874 | 0.000489 |
| 17 | 0.311057 | 0.212252 | 0.000516 |
| 128 | 0.311615 | 0.211556 | 0.000521 |
| 77 | 0.313011 | 0.216614 | 0.000533 |
| 101 | 0.31374 | 0.218121 | 0.00054 |
| 99 | 0.315736 | 0.2238 | 0.000558 |
| 123 | 0.318287 | 0.230647 | 0.000581 |
| 75 | 0.320275 | 0.237435 | 0.0006 |
| 122 | 0.320396 | 0.236797 | 0.000602 |
| 31 | 0.322869 | 0.24595 | 0.000626 |
| 30 | 0.324545 | 0.250981 | 0.000643 |
| 155 | 0.326419 | 0.253511 | 0.000662 |
| 3 | 0.330254 | 0.268738 | 0.000704 |
| 70 | 0.331136 | 0.270369 | 0.000713 |
| 135 | 0.333123 | 0.27492 | 0.000736 |
| 151 | 0.33357 | 0.275826 | 0.000741 |
| 134 | 0.334562 | 0.27953 | 0.000752 |
| 148 | 0.335678 | 0.28256 | 0.000766 |
| 46 | 0.338797 | 0.295125 | 0.000803 |
| 64 | 0.341711 | 0.304342 | 0.00084 |
| 10 | 0.34188 | 0.305912 | 0.000842 |
| 110 | 0.347831 | 0.323551 | 0.000921 |
| 137 | 0.348814 | 0.32592 | 0.000934 |
| 136 | 0.349043 | 0.326644 | 0.000938 |
| 147 | 0.354051 | 0.343326 | 0.00101 |
| 145 | 0.355126 | 0.347048 | 0.001026 |
| 133 | 0.355463 | 0.348635 | 0.001031 |
| 121 | 0.357885 | 0.35738 | 0.001068 |
| 143 | 0.357938 | 0.356775 | 0.001069 |
| 129 | 0.360128 | 0.36486 | 0.001103 |
| 154 | 0.361995 | 0.370483 | 0.001133 |
| 153 | 0.362734 | 0.373018 | 0.001146 |
| 132 | 0.368675 | 0.394808 | 0.001247 |
| 112 | 0.370049 | 0.400355 | 0.001271 |
| 7 | 0.370976 | 0.405865 | 0.001288 |
| 120 | 0.373522 | 0.412523 | 0.001335 |
| 139 | 0.381661 | 0.441235 | 0.001495 |
| 111 | 0.384826 | 0.45377 | 0.001561 |
| 125 | 0.388562 | 0.466892 | 0.001642 |
| 86 | 0.389471 | 0.471225 | 0.001662 |
| 102 | 0.390658 | 0.475317 | 0.001689 |
| 103 | 0.391663 | 0.478869 | 0.001712 |
| 108 | 0.392506 | 0.481882 | 0.001732 |
| 107 | 0.3937 | 0.486232 | 0.00176 |
| 65 | 0.393817 | 0.487777 | 0.001762 |
| 23 | 0.404372 | 0.526964 | 0.002026 |
| 92 | 0.408067 | 0.538776 | 0.002125 |
| 90 | 0.41337 | 0.558118 | 0.002276 |
| 1 | 0.414682 | 0.564204 | 0.002314 |
| 38 | 0.414712 | 0.564086 | 0.002315 |
| 13 | 0.435332 | 0.6371 | 0.002996 |
| 49 | 0.437314 | 0.643047 | 0.003069 |
| 57 | 0.462473 | 0.724285 | 0.004141 |
| 6 | 0.465923 | 0.73524 | 0.00431 |
| 47 | 0.483934 | 0.785895 | 0.005291 |
| 25 | 0.505269 | 0.838858 | 0.006692 |
| 11 | 0.50961 | 0.848491 | 0.007013 |
| 9 | 0.512945 | 0.855768 | 0.007268 |
| 4 | 0.544487 | 0.912417 | 0.010108 |
| 12 | 0.553658 | 0.925403 | 0.011096 |
| 14 | 0.564023 | 0.938475 | 0.012312 |
| 5 | 0.57855 | 0.953677 | 0.014213 |
| 8 | 0.581336 | 0.956276 | 0.014606 |
| 15 | 0.632392 | 0.98668 | 0.023721 |