Appendix A

Property of arcsin transformation

It is known[1] that for any numbers x and y,

$$\arcsin(x)+\arcsin(y)=\arcsin\left(x\sqrt{1-y^2}+y\sqrt{1-x^2}\right).$$

Using this identity we have

$$\arcsin(\sqrt{y})+\arcsin(\sqrt{1-y})=\arcsin(\sqrt{y}\cdot\sqrt{y}+\sqrt{1-y}\cdot\sqrt{1-y})=\arcsin(1)=\pi.$$

References

1. Abramowitz M, Stegun IA, eds. *Handbook of Mathematical Functions with Formulas, Graphs, and Mathematical Tables*. New York: Dover Publications; 1972.