

# Hypothesis testing based on the empirical characteristic function

Alice Wonder<sup>1\*\*</sup>    Robert Dreamer<sup>2†</sup>    Charlie Imagineer<sup>3‡</sup>

Hypothesis testing plays a crucial role in statistical analysis, providing a framework for making inferences about population parameters. In this study, we explore a novel approach to hypothesis testing utilizing the empirical characteristic function.

The empirical characteristic function offers a unique perspective by capturing the distributional properties of a dataset. By leveraging this function, we develop new statistical tests for various hypotheses, with applications ranging from assessing the normality of a sample to testing specific distributional assumptions.

This research contributes to the broader field of statistical analysis by expanding the toolkit of hypothesis testing techniques. The proposed methods offer a robust and flexible framework, providing researchers and practitioners with valuable tools for exploring the underlying characteristics of data.

## Acknowledgments

This work was supported by the Slovak Scientific Grant Agency VEGA, under grants VEGA 2/0047/15 and VEGA 2/0043/13.

## References

- [1] ANDERSON, T. W. and DARLING, D. A. (1952). Asymptotic theory of certain goodness-of-fit criteria based on stochastic processes. *Annals of Mathematical Statistics* **23** 193–212.
- [2] CSÖRGŐ, S. and FARAWAY, J. J. (1996). The exact and asymptotic distributions of Cramér-von Mises statistics. *Journal of the Royal Statistical Society, Series B* **58** 221–234.
- [3] MARSAGLIA, G. and MARSAGLIA, J. (2004). Evaluating the Anderson-Darling distribution. *Journal of Statistical Software* **9**, 1–5.
- [4] GIL-PELAEZ, J. (1951). Note on the inversion theorem. *Biometrika* **38** 481–482.

---

<sup>\*1</sup>Wonderland University, Wonderland, [alice.wonderland@example.com](mailto:alice.wonderland@example.com)

<sup>†2</sup>Dreamland Institute, Dreamland, [bob.dreamer@example.com](mailto:bob.dreamer@example.com)

<sup>‡3</sup>Imagination College, Imaginationland, [charlie.imagineer@example.com](mailto:charlie.imagineer@example.com)