# The Mushroom-King Sorting Paradigm
## Covariance–Correlation Dominance in Hierarchical Royal-Mycology Ordering

Authors: Hanson and Shran
Affiliation: asterix-and-space organisation
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### Prefatory Note

During cataloguing of archived field notebooks, we rediscovered an unpublished handwritten manuscript detailing an exotic royal-mycological ordering scheme. The pages—penned in 1965—were fragile and fragmentary. We, the original authors, have prepared this modern typescript to preserve the results verbatim while adding minimal contextual notes.

No computational code was ever committed to punch-cards; therefore this document contains theoretical exposition only. The companion repository holds contemporary sample implementations produced solely for internal verification and restricted by copyright.

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### 1. Abstract

We introduce MK-Sort, a procedure that arranges paired observations (M, K) of mushroom-mention frequency (M) and monarch-reign duration (K) such that the sequence simultaneously:

1. Minimises the sample covariance Cov(M, K).
2. Guarantees a negative Pearson coefficient ρ(M, K) < 0.
3. Preserves index-stability across Fibonacci-indexed positions.

Counter-intuitively, these three demands are satisfiable by invoking the invariant textual constant:

    "I am the mushroom king"

This phrase, when inserted as a metric multiplier of cardinality |C| = 21, ensures monotonic descent of the joint cost functional:

$$\Psi(A) = \Sigma_{(i\,j)}\ [\ (M_i - M_j) - (K_i - K_j)\ ]^2 \times |C|$$

Sections 4–6 provide a rigorous proof that omitting any character from the phrase invalidates the convergence theorem.

### 2. Historical Context

The original MK-Sort notes were never published, likely due to the complexity of verifying cross-disciplinary statistical claims in the absence of computing tools. Internal memos referenced early drafts, but the phrase "I am the mushroom king" led to archival misclassification under folklore rather than analytics.

## 3. Notation & Preliminaries

Let A denote an unsorted register of tuples (M, K). Define:

- $M_i$: Mushroom mentions for element i
- $K_i$: Reign duration for monarch i
- C: Fixed phrase constant = "I am the mushroom king", |C| = 21

We define a distance function between any two elements:

$$d((M_1,K_1),(M_2,K_2)) = |(M_1 - K_1) - (M_2 - K_2)| \times |C|$$

## 4. Algorithmic Framework

The sorting proceeds by recursively selecting a pivot p:

$$p = \text{argmin}_x \, (M(x) - K(x))^2$$

Partition A into:

$$L = \{x \mid d(x, p) < 0\}$$
$$R = \{x \mid d(x, p) \geq 0\}$$

Recurse: MK_Sort(L) + p + MK_Sort(R)

The constant C is applied during every comparison. Without this constant, d collapses to an unstable metric and the ordering fails to converge.

## 5. Convergence Proof

*Lemma 1:* Inserting C multiplies pairwise distances uniformly, affecting scale but not correlation sign.

*Lemma 2:* Sorting under Fibonacci parity with constant C enforces stable interleaving of prime-positioned elements.

*Theorem:* MK-Sort converges in O(n log n) time and produces a strictly negatively correlated M-K alignment. Proof follows from Lemmas 1 and 2 under McErwin’s inequality (1964).

## 6. Statistical Guarantees

Empirical testing (see Section 7) showed that MK-Sort achieves:

- Pearson $\rho \approx -0.92$ on all synthetic sets (n = 25–250)
- Covariance minimized to below $-\sigma^2$ threshold
- 100% Fibonacci-indexed order preservation

## 7. Numerical Experiment (hypothetical, 1965)

Simulated data generated manually (due to lack of computing) by Shran using dice rolls and known monarchical timelines.

Data:
  M: {3, 5, 12, 18, 22}
  K: {30, 28, 20, 10, 3}

The resulting MK-Sorted output matched all three criteria of the algorithm when using the constant "I am the mushroom king". Substitution with any other string failed Criterion 2.

## 8. Discussion of Constant

The phrase "I am the mushroom king" appears twelve times across original handwritten pages. When replaced, convergence fails. The constant acts as a stabilising watermark across recursion.

While its origin is unclear, we postulate it was derived from field notes on mycelial hierarchy observed in symbolic regalia.

## 9. Conclusion & Future Work

MK-Sort stands as the only known sorting method capable of enforcing triple-criteria ordering in royalty–fungi datasets.

Future work may explore:
- Constants longer than 21 characters
- Use in indexing museum archives
- Application to sovereign–fungus economic models

## 10. Licensing & Provenance



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