Shape comparisons, deformation penalties and geometric matching — review sheet

Use this after attempting the worked examples and practice. Explain each claim in words before calculating.

Key ideas

- A distance requires a representation, units, correspondence and declared invariances.
- Finite cyclic shifts remove the choice of first index while preserving direction and local order.
- Proper rigid fits preserve physical size.
- The finite score separates amplitude and neighbor variation on a fixed grid.
- Elastic path energy and endpoint matching have distinct roles.
- Synthetic grouping is evidence about the implemented comparison, not clinical categories.

Common errors and repairs

Comparing shades across matrices with different color scales. Read numerical entries and each colorbar in mm.

Calling a quadratic score a full elastic geodesic. Document the actual fixed-array calculation and its missing path/geometry operations.

Assuming a tiny endpoint error implies a cheap deformation. Distinguish endpoint fidelity from path cost.

Retrieve without your notes

- Which known pairs should have near-zero rigid/cyclic RMS?
- How does E change when every displacement is doubled?
- What happens to the roughness term for a constant displacement?

Readiness check

- Compare raw and rigid/cyclic RMS matrices while naming the removed nuisance transformations.
- Explain why size differences survive the chosen alignment rule.
- Compute a finite displacement score and distinguish amplitude from neighbor variation.
- Separate a deformation-path cost from an endpoint matching term and state the limited role of the implemented toy.

- Write a small synthetic cohort report with units, invariances, numerical checks and a bounded conclusion.