Optimising the shape of photometric redshift distributions with clustering cross-correlations

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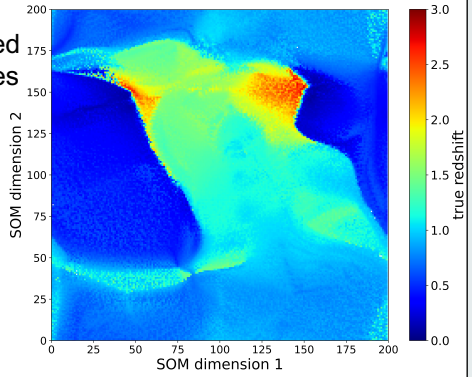
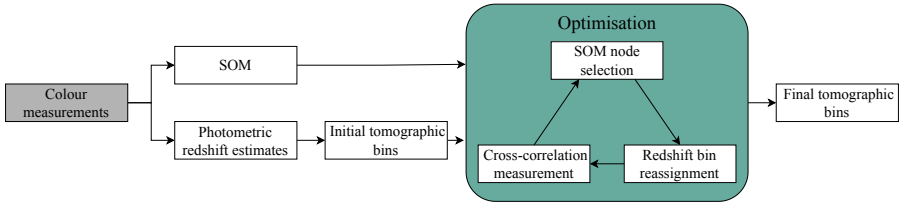
Goals:

Optimising the assignment of galaxies to tomographic redshift bins and reducing the rate of catastrophic outliers in the redshift distribution.

Methods:

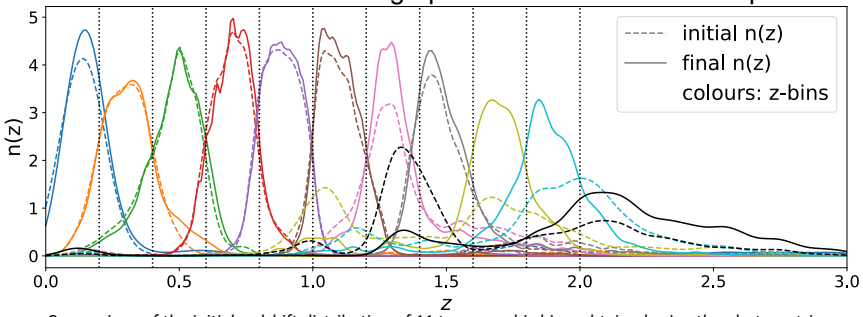
- Self-organising map (SOM), trained on the observed colours of galaxies
- Clustering cross-correlation measurements between a photometric galaxy sample and a reference sample with known redshifts
- Reassignment of galaxies to tomographic bins via simulated annealing





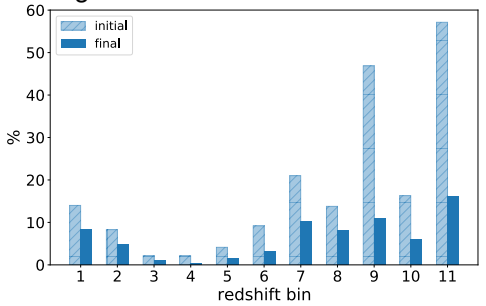
Results:

Redshift distributions of 11 tomographic bins before and after optimisation



Comparison of the initial redshift distribution of 11 tomographic bins, obtained using the photometric redshift estimate of individual galaxies (dashed lines), and the redshift distribution after optimisation via simulated annealing (solid lines). Dotted lines indicate the redshift bin edges.

Fraction of galaxies in the tails of the redshift distribution



Comparison of the percentage of the redshift distribution that is located within the tails of the distribution before and after optimisation.