

Photo-z selection function

(15)

1. Clustering of Healpix in the Depth Maps

35 mag limit^(*)
RA, DEC

N clusters

Initial guess:
mag bands $\times 2$.
Algorithm: Mini Batch KMeans

(*) Set to 14 when no detection

2. Map photo-z and masterlist objects to their depth cluster

3. Create binary photo-z selection function

$$\boxed{\text{frac}} = \frac{\# \text{ sources with photo-z}}{\# \text{ sources masterlist}} \text{ per cluster} \equiv \text{Basic photo-z selection function}$$

4. Magnitude dependent photo-z selection functions

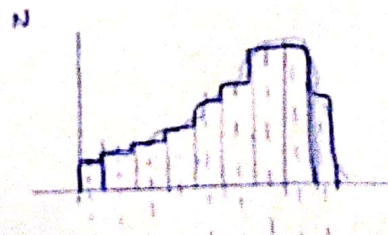
⊗ Redshift quality criteria:

Based on information about the width of the primary and secondary peaks above the 80% HPD credible interval.

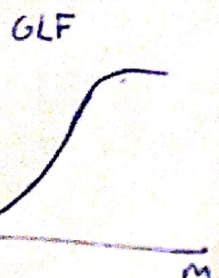
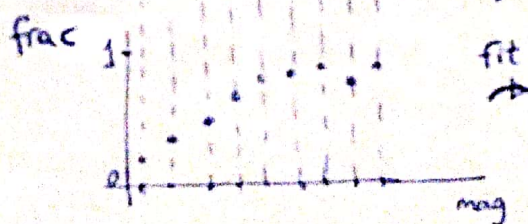
$$\frac{\Delta Z_{80\% \text{ HPD}}}{1 + Z_{\text{phot}}} < 0.2$$

$$\Delta Z_{80\% \text{ HPD}} = 0.5 \cdot [Z_{1-\text{max}} - Z_{1-\text{min}}] \quad ; \quad Z_{\text{phot}} = Z_{1-\text{median}}$$

⊗ For each magnitude:

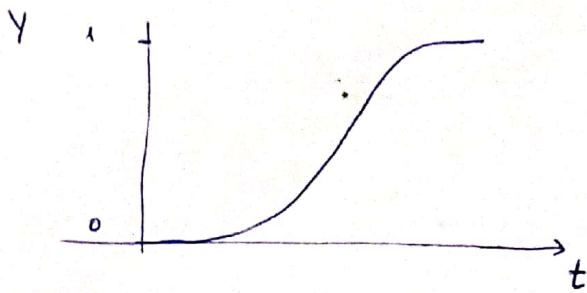


⊗ for each cluster:



⇒ Parameters of GLF per each cluster, per magnitude band.

Generalised Logistic Function (GLF)



$$Y(t) = A + \frac{K - A}{(C + Qe^{-B(t-M)})^{1/\nu}}$$

Parameters used / bounds

$A \equiv$ Lower Asymptote

$K \equiv$ Upper Asymptote when $C=1$

If $\begin{cases} A=0 \\ C=1 \end{cases} \Rightarrow$ carrying capacity

$B \equiv$ Growth rate

$Q \equiv$ related to $Y(0)$

$\nu > 0 \equiv$ affects near which asymptote max growth occurs

C is typically 1, otherwise:

$$K = A + \frac{K-A}{C^\nu}$$

$M \equiv$ time M

$$A = \text{median}(\text{frac}[5]) \parallel (0, 1)$$

$$K = 0 \quad (0, 1)$$

$$B = 0.9 \quad (0, 5)$$

$$Q = 1 \quad (0, 10)$$

$$\nu = 0.4 \quad (0, \text{None})$$

$$C = 1 \quad \text{Fixed}$$

$$M = \text{igr25_mag} \quad \left(\begin{array}{l} \min(\text{mag}, 17) \\ \min(\text{mag}, 29) \end{array} \right)$$