Formulas

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Abstract

Just a summary of formulas I use . . .

1 Great Circle Distance

The shortest distance between two points s, t on the surface of a sphere is given by

$$d = r \sphericalangle_s^t \tag{1}$$

where $\sphericalangle$ is termed central angle and r is the radius. The central angle is given by

$$\cos \sphericalangle_s^t = \frac{s \cdot t}{|s||t|} \tag{2}$$

and the inner product in spherical coordinates reads

$$s \cdot t = |s||t| \left(\sin \theta_s \sin \theta_t \cos(\phi_s - \phi_t) + \cos \theta_s \cos \theta_t \right) \ . \tag{3}$$

where φ refers to longitude and θ to co-latitude. References: `https://en.wikipedia.org/wiki/Great-circle_distance` and `https://en.wikipedia.org/wiki/Spherical_law_of_cosines`

2 Great Circle Path

Parametric expression along a great circle Consider two points s and t located at the Earth's surface. Required is an equation parametrizing the grate circle passing through s and r.

3 Gaussian Kernel

$$K(\mathbf{x}, \mathbf{x}') = \exp\left(-\frac{\|\mathbf{x} - \mathbf{x}'\|^2}{2\sigma^2} \right) \tag{4}$$