3.3 Interpolation Techniques

The atmospheric model uses a Reduced Gaussian Octahedral grid (which is triangular in nature). Interpolation of NWP model values to and from the MIR grid uses a triangular interpolation technique which:

- interpolates to deliver a value for an off-grid location (red point), for output purposes, by using model values at the grid vertices (black points).

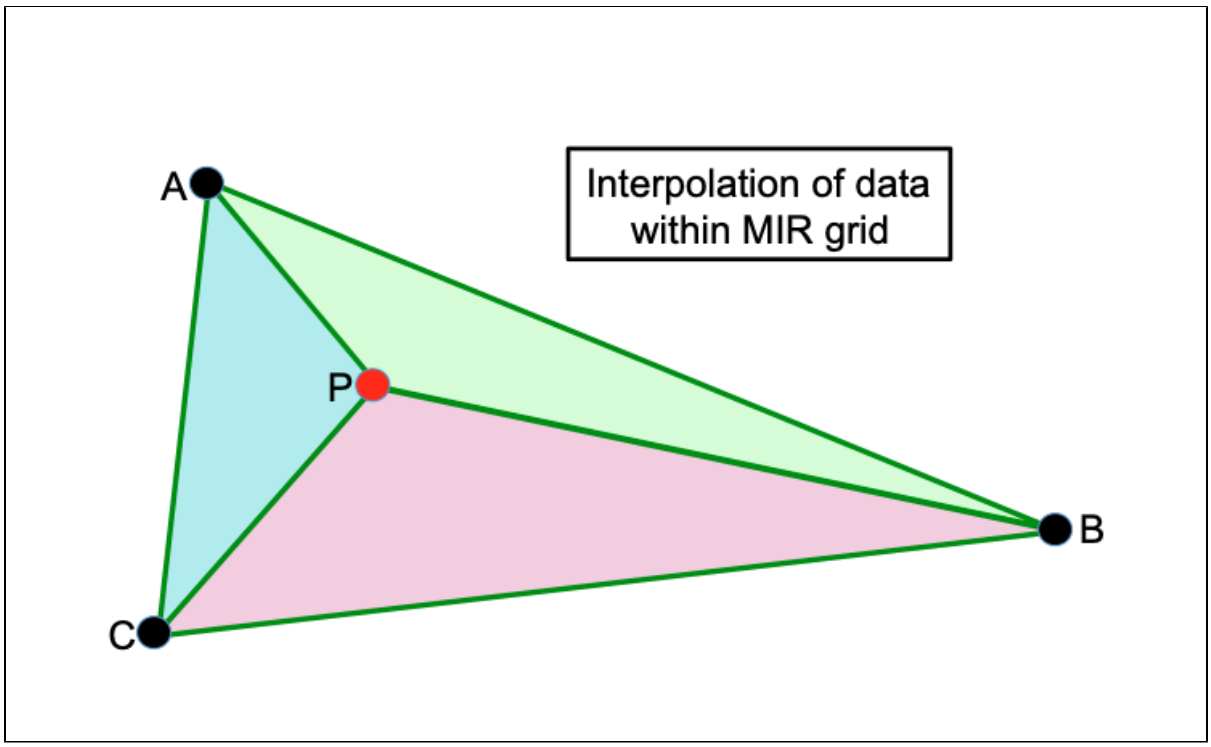
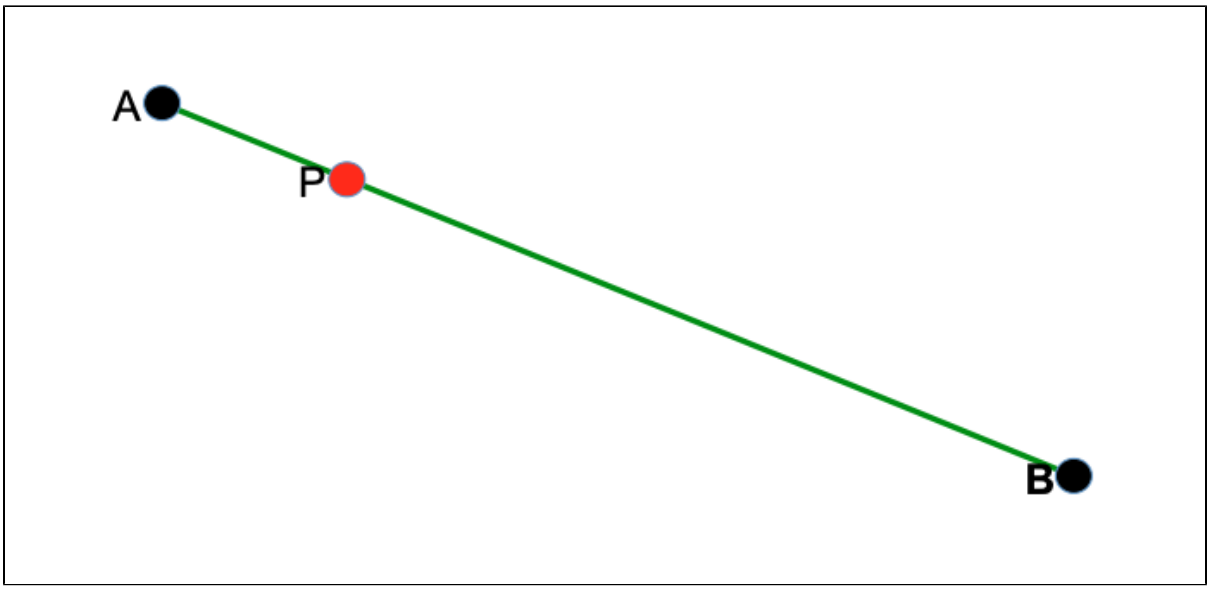


Fig3.3.1: *The Reduced Gaussian grid is triangular in nature. The interpolation uses the three corner points (black points) closest to the selected location (red point) and takes a weighted average based upon the proximity of the point to the to vertices to arrive at the interpolated value.*

In deriving a value for point P the weighting factor apportioned to each point A,B,C is equal to the area of the diametrically opposite triangle. Therefore the weighting for:

- Point A is equal to the area of triangle PBC (pink) divided by area of triangle ABC. (Weighting $= W_{A)}$.
- Point B is equal to the area of triangle PCA (cyan) divided by area of triangle ABC. (Weighting $= W_{B)}$.
- Point C is equal to the area of triangle PAB (green) divided by area of triangle ABC. (Weighting $= W_{C)}$.
- The value at point P is then the sum of these three contributions: i.e. $P = (A \times W_A) + (B \times W_B) + (C \times W_C)$

A special case then arises when Point P lies on the line directly between two points. (see diagram).



The weighting factor apportioned to each point is by linear interpolation. Therefore the weighting for:

- Point A is equal to the distance PB divided by the length of AB. (Weighting $= W_{A)}$.
- Point B is equal to the distance AP divided by the length of AB. (Weighting $= W_{B)}$.
- The value at Point P is then the sum of these two contributions: i.e. P = (A x A_W) + (B x B_W)