Description of the averaging algorithm used in bemol
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The "bemol" utility offers the possibility of averaging source fields defined on grids referenced using positional records (^^, >>). The averaging can be done in automatic or manual mode.

The automatic mode is used for variable grids. In that mode, the averaging factor is computed as the ratio of the spacing between the grid points in the core part of the grid over the spacing between the coarsest part of the grid. The 1st is found normally in the middle of the grid, and the 2nd is defined as (ax(2)-ax(1)). So the averaging factor could be computed as

$$avg = \frac{(ax(nig/2) - ax(nig/2-1))}{(ax(2) - ax(1))}$$

The typical ratios observed are in the order of 4-6.

The computed averaging factor is then multiplied by the spacing in the core part of the grid to compute an average dx over the entire domain.
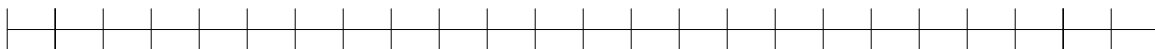
dxcoarse = avg * dxcore

The size (in grid points) of the averaged grid is computed using

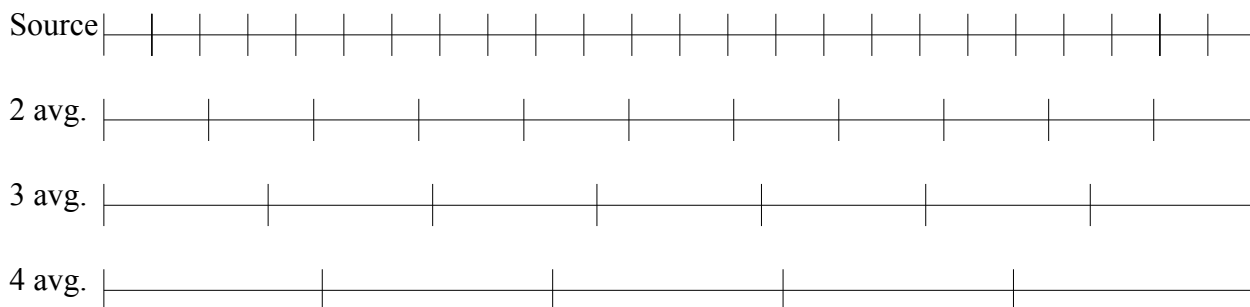|	
nicoarse = nint((ax(nig)-ax(1))/(avg * dxcore)	njcoarse = nint((ay(njg)-ay(1))/(avg * dycore)

and the dxcoarse and dycoarse are computed using

dxcoarse = (ax(nig)-ax(1)/(1.0*(nicoarse-1))	dycoarse = (ay(njg)-ay(1))/(1.0*(njcoarse-1))

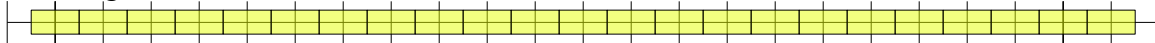Schematically, suppose we have a 25x25 grid point regular grid, whose x-axis is shown here,

An average factor of 2, 3 and 4 would give the following configuration

When computing the averages, we assume that the zone of influence of an averaged grid point is ±0.5 grid points (in coarse coordinates), and the influence of a source grid point is also ±0.5 grid points.
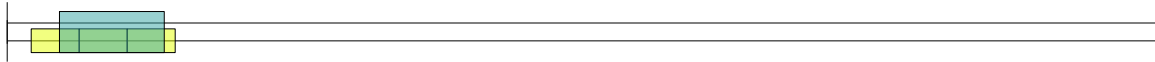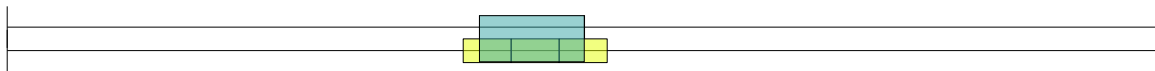
Source grid:

Coarse grid:

This diagram shows the contributions of source grid points 2,3 and 4 for coarse point 2.
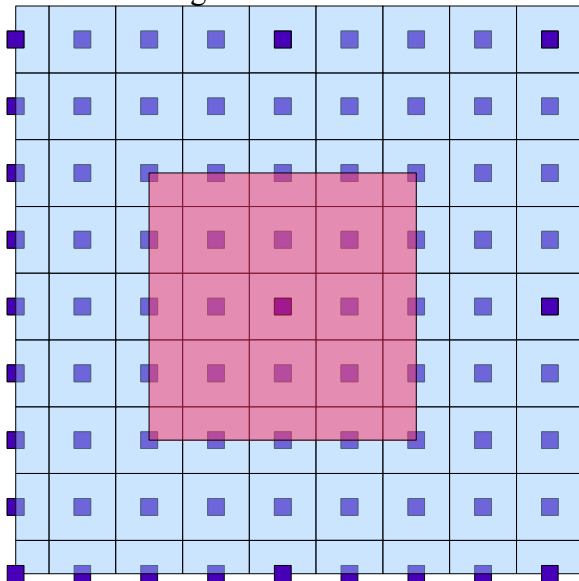
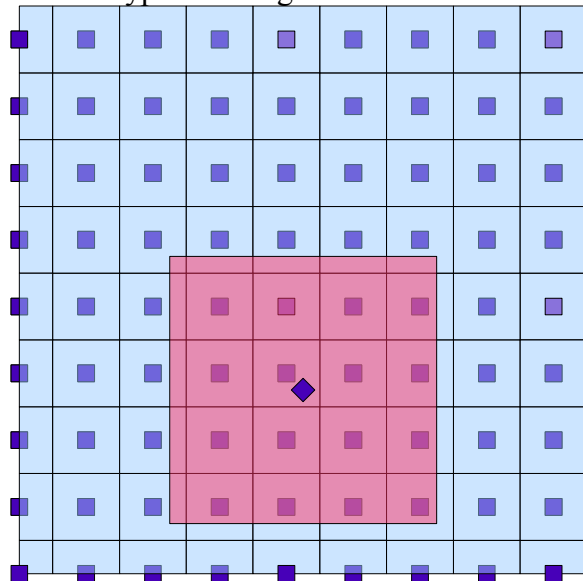... and this one of source grid points 10, 11 and 12 for coarse point 6

When viewed in 2D this gives the following picture. The red area shows the coverage of a coarse grid point, the blue areas the coverage of the source grid.

An ideal configuration

A more typical configuration

The average value of the coarse grid point is computed as the sommation of all the source grid points in contact with the coarse cell weighted by the overlapping area.