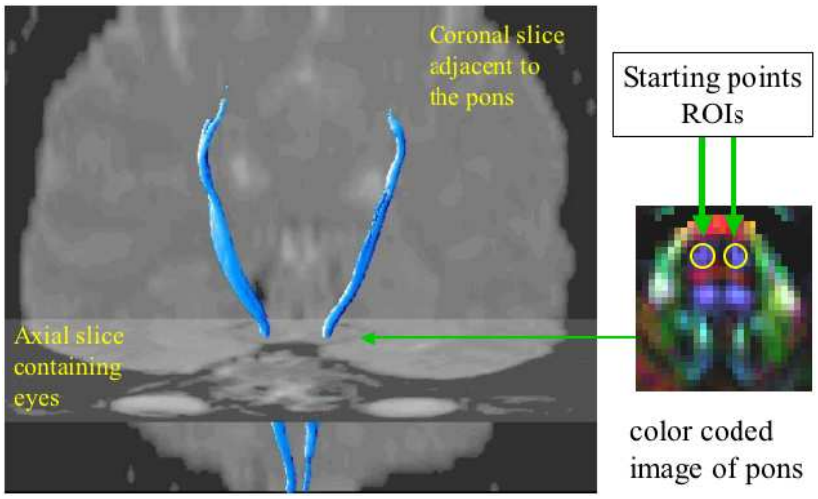

Fig. 18.2. Fiber tracts result from integrating along the tangent direction of the B-spline approximated tensor field, and with starting points chosen from the two circular regions in the area of pons. The obtained result agrees well with known anatomical data

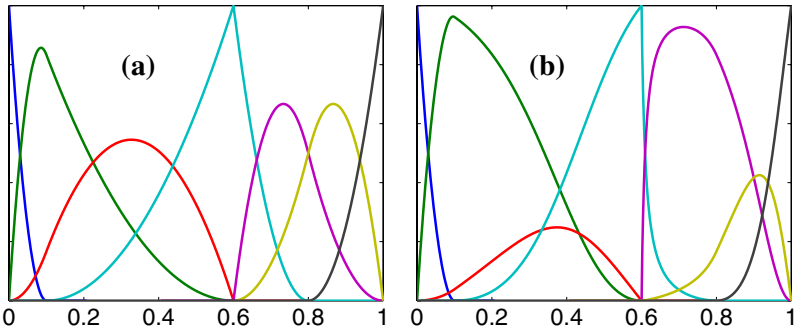

Fig. 18.3. (**a**) A set of 1-D NUB-basis functions with $p = 2$ and the knot vector $U = [0\ 0\ 0\ 0.1\ 0.6\ 0.6\ 0.8\ 1\ 1\ 1]$. (**b**) A set of rational basis functions (NURBS) obtained using the NUBs in (a) and by changing the weights for the 3rd, 4th and 5th basis function to 0.2, 0.5 and 5, respectively. The remaining NUBs had weights $w = 1$

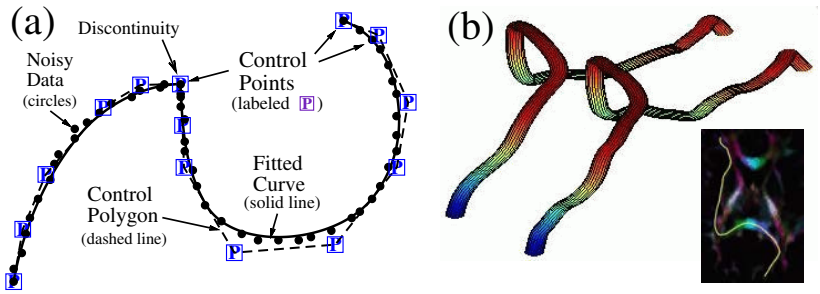

Fig. 18.4. (**a**) 2-D curve NURBS model fit to noisy data (**b**) 3-D curve NURBS model fit to fiber tracking data, indicated on the inset image

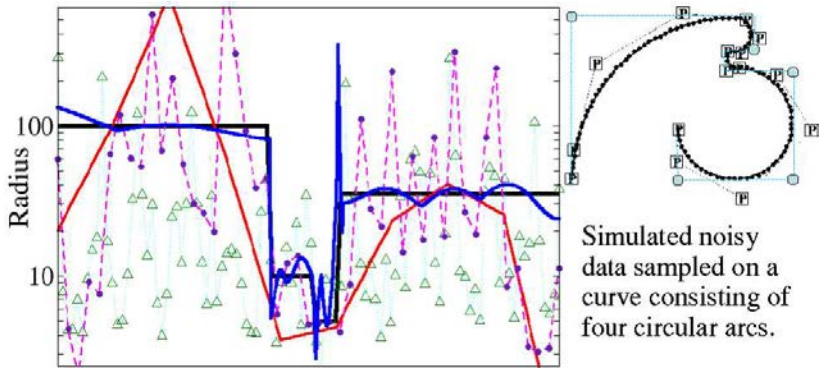

Fig. 18.5. Radii of curvature obtained from a noisy data set of points sampled from a curve consisting of four circular arcs (see the inset in upper right corner) with radii 100,10,5,35. The sampling error was 1%. The *solid black line* indicates the true radius (at inflection points the radius is infinite). The *solid blue line* indicates the NURBS fit, while B-spline approximation estimates are labeled as follows: $\Delta = 1$, i.e., interpolation (green triangles), $\Delta = 0.5$ (purple dots), or $\Delta = 0.2$ (*red solid line*). Note that the original curve could have been described with only 10 control points (the *light blue circles*, not all shown)

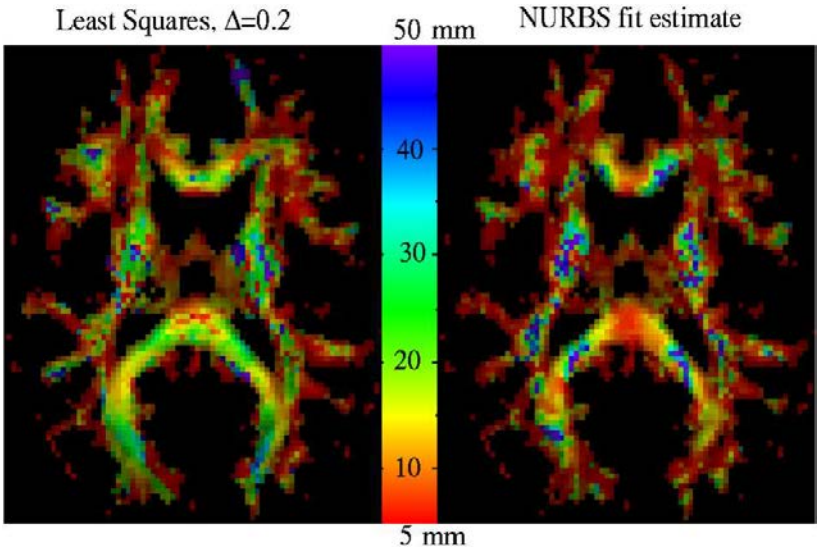

Fig. 18.6. Color coded images of the radius of curvature obtained at the center of each voxel for the given slice using B-spline approximation with $\Delta = 0.2$ (*left*) and NURBS (*right*), with colorbar indicating the scales. We see that the NURBS estimates are capable of showing the spatial variation of the fiber curvature. Note, that although the models are continuous, the estimates obtained from them are not necessarily smooth. The pixelization in the image, however, is arbitrary and we could have obtained the estimates at any point in space with the continuous models