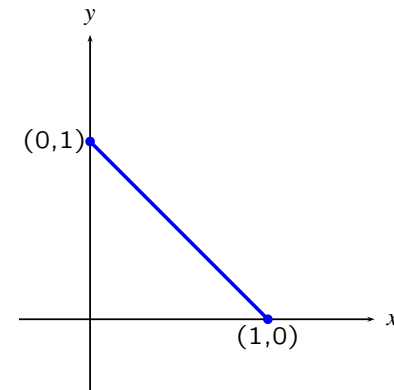Four Dimensional Barycentric Plots in 3D

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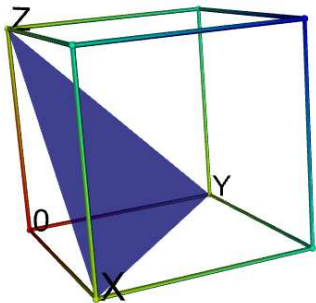Points constrained by $0 \le x, y \le 1$ and $x + y = 1$ lie on a line segment.

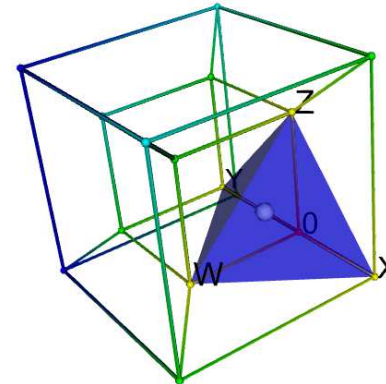Such points are frequently probability distributions or proportions: p_1, p_2

Points constrained by $0 \le x, y, z \le 1$ and $x + y + z = 1$ lie on a triangle in the plane.

Rotating this triangle without distortion into the $x - y$ plane gives the familiar quadplot or barycentric plot.

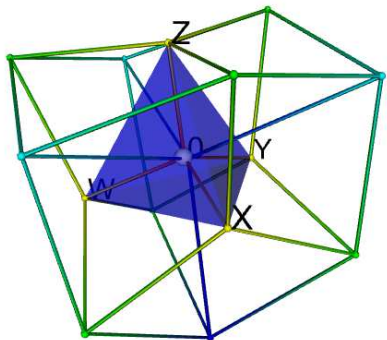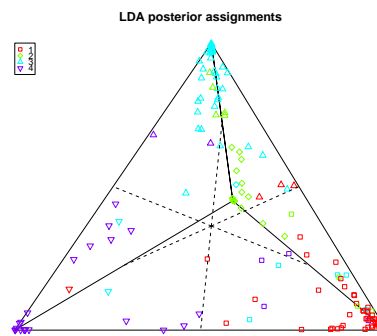Points constrained by $0 \le w, x, y, z \le 1$ and $w + x + y + z = 1$ lie in a 3d tetrahedron in 4d space.

Rotating this tetrahedron by $\pi/4$, $\pi/5$ and $\pi/6$ in the $w-z$, $x-z$ and $y-z$ planes brings it into 3d space without distortion.
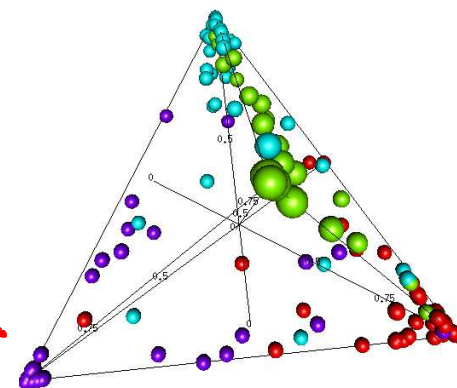
4d points can be plotted in 3d.

LDA posterior assignments

Quadplot from klaR package.
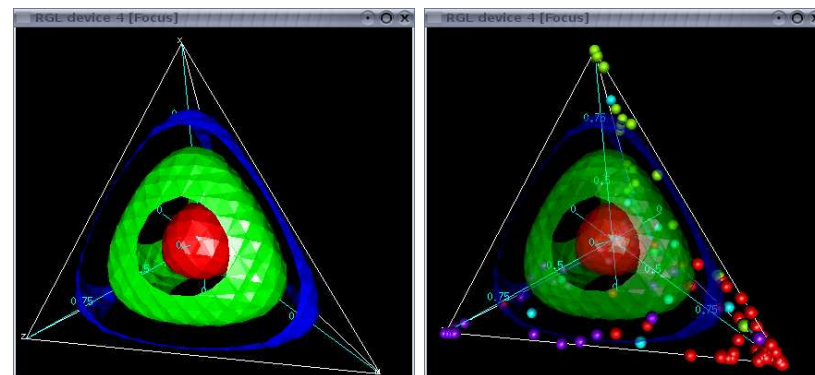
Same points plotted with quad3d.

Quad3d uses the rgl package.
- Real time interactive openGL graphics.
- Similar options to rgl plotting, including bounding tetrahedra.
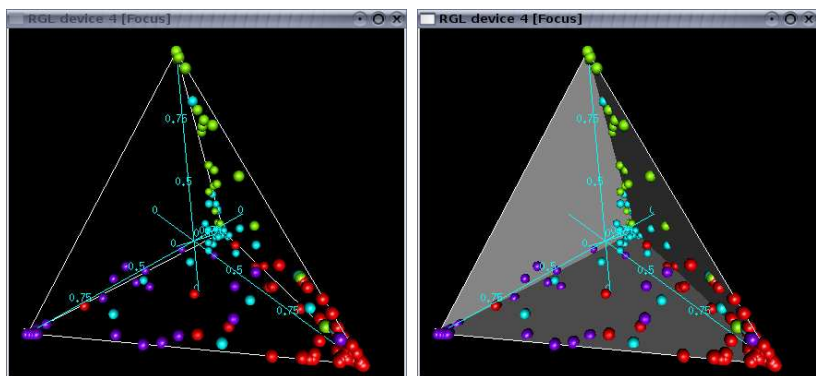
Isosurfaces can be plotted, similar to the misc3d package.

$$\text{Entropy} = -\sum_i p_i \log(p_i)$$

Cross-tabulated data can be viewed.

	w	x	y	z
1	11	3	4	1
2	8	5	1	1
3	10	7	2	2
4	3	11	5	1
5	2	8	10	4
6	3	4	11	5
7	0	1	9	10
8	0	2	3	13

Four Dimensional Barycentric Plots in 3D