https://github.com/t-o-k/Maxima-bezier/rational_bezier_curves_2d.wxmx

(%i1)
```
kill(all)$
```

(%i1)
```
load("draw")$
```

(%i2)
```
load("bezier")$
```

(%i3)
```
tau: 2*%pi$
```

(%i4)
```
angle: tau/4;  /* No. of parts is 4 */
```

(angle) $\frac{\pi}{2}$

(%i5)
```
weights: matrix([ 1, cos(angle/2), 1 ]);
```

(weights) $\begin{pmatrix} 1 & \frac{1}{\sqrt{2}} & 1 \end{pmatrix}$

(%i7)
```
points1_x: matrix([  0,  r,  r ])$
points1_y: matrix([ -r, -r,  0 ])$
```

(%i9)
```
points2_x: matrix([  r,  r,  0 ])$
points2_y: matrix([  0,  r,  r ])$
```

(%i11)
```
points3_x: matrix([  0, -r, -r ])$
points3_y: matrix([  r,  r,  0 ])$
```

(%i13)
```
points4_x: matrix([ -r, -r,  0 ])$
points4_y: matrix([  0, -r, -r ])$
```

(%i14)
```
define(f1_x(s), rational_bezier_function_1a(points1_x, weights, s));
```

(%o14) $$f1_x(s) := \frac{r\,s^2 + \sqrt{2}\,r\,(1-s)\,s}{s^2 + \sqrt{2}\,(1-s)\,s + (1-s)^2}$$

(%i15)
```
define(f1_y(s), rational_bezier_function_1a(points1_y, weights, s));
```

(%o15) $$f1_y(s) := \frac{-\sqrt{2}\,r\,(1-s)\,s - r\,(1-s)^2}{s^2 + \sqrt{2}\,(1-s)\,s + (1-s)^2}$$

```
(%i16) define(f2_x(s), rational_bezier_function_1a(points2_x, weights, s));
```

(%o16) $$f2_x(s):=\frac{\sqrt{2}\,r\,(1-s)\,s+r\,(1-s)^2}{s^2+\sqrt{2}\,(1-s)\,s+(1-s)^2}$$

```
(%i17) define(f2_y(s), rational_bezier_function_1a(points2_y, weights, s));
```

(%o17) $$f2_y(s):=\frac{r\,s^2+\sqrt{2}\,r\,(1-s)\,s}{s^2+\sqrt{2}\,(1-s)\,s+(1-s)^2}$$

```
(%i18) define(f3_x(s), rational_bezier_function_1a(points3_x, weights, s));
```

(%o18) $$f3_x(s):=\frac{-r\,s^2-\sqrt{2}\,r\,(1-s)\,s}{s^2+\sqrt{2}\,(1-s)\,s+(1-s)^2}$$

```
(%i19) define(f3_y(s), rational_bezier_function_1a(points3_y, weights, s));
```

(%o19) $$f3_y(s):=\frac{\sqrt{2}\,r\,(1-s)\,s+r\,(1-s)^2}{s^2+\sqrt{2}\,(1-s)\,s+(1-s)^2}$$

```
(%i20) define(f4_x(s), rational_bezier_function_1a(points4_x, weights, s));
```

(%o20) $$f4_x(s):=\frac{-\sqrt{2}\,r\,(1-s)\,s-r\,(1-s)^2}{s^2+\sqrt{2}\,(1-s)\,s+(1-s)^2}$$

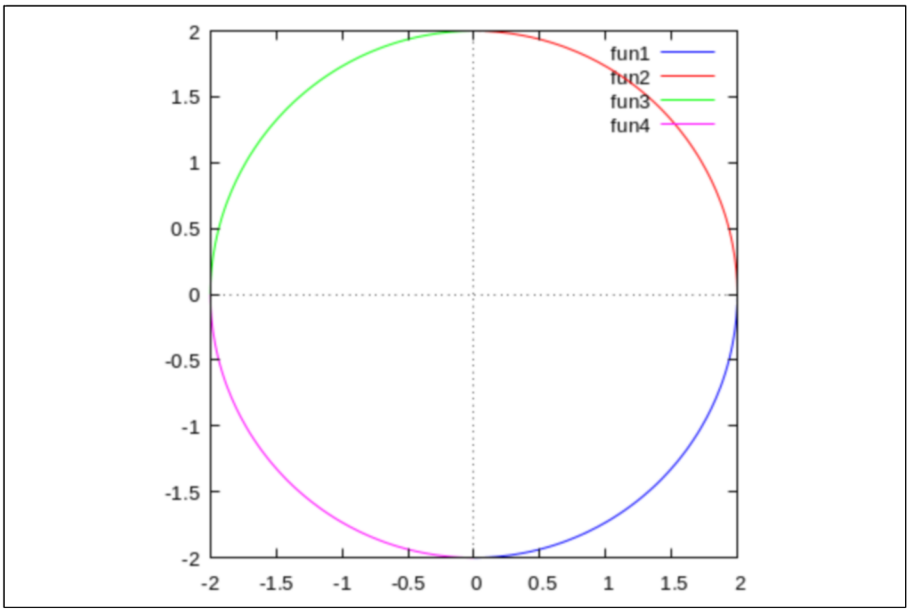
```
(%i21) define(f4_y(s), rational_bezier_function_1a(points4_y, weights, s));
```

(%o21) $$f4_y(s):=\frac{-r\,s^2-\sqrt{2}\,r\,(1-s)\,s}{s^2+\sqrt{2}\,(1-s)\,s+(1-s)^2}$$

```
(%i22) curve_1: [ parametric, f1_x(s), f1_y(s), [ s, 0, 1 ] ]$  /* fun1 */

(%i23) curve_2: [ parametric, f2_x(s), f2_y(s), [ s, 0, 1 ] ]$  /* fun2 */

(%i24) curve_3: [ parametric, f3_x(s), f3_y(s), [ s, 0, 1 ] ]$  /* fun3 */

(%i25) curve_4: [ parametric, f4_x(s), f4_y(s), [ s, 0, 1 ] ]$  /* fun4 */

(%i26) r: 2$
```

(%i27) wxplot2d([curve_1, curve_2, curve_3, curve_4], same_xy);

(%t27)



(%o27)