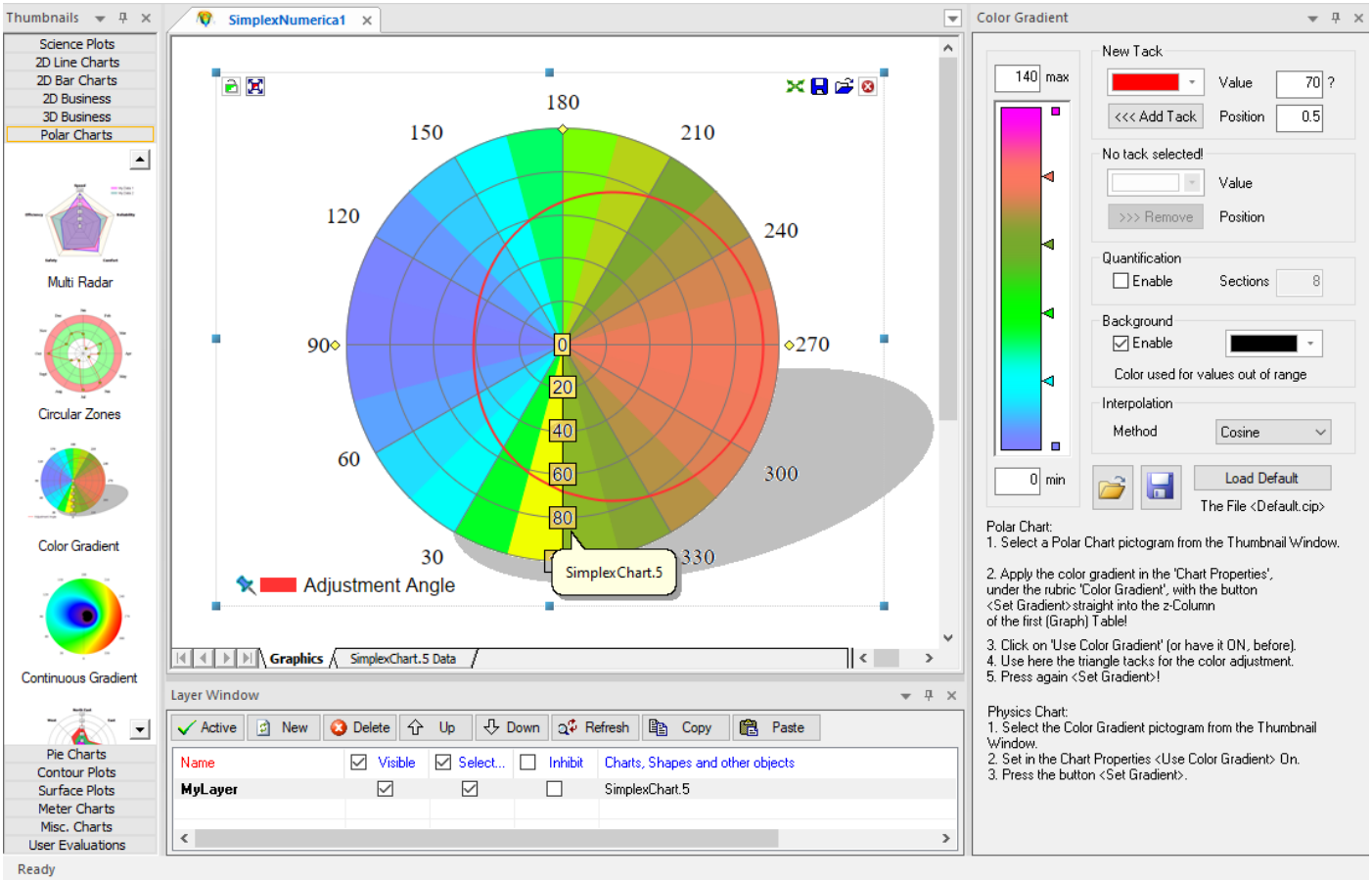
Info to SimplexNumerica

Polar Chart with Color Gradient

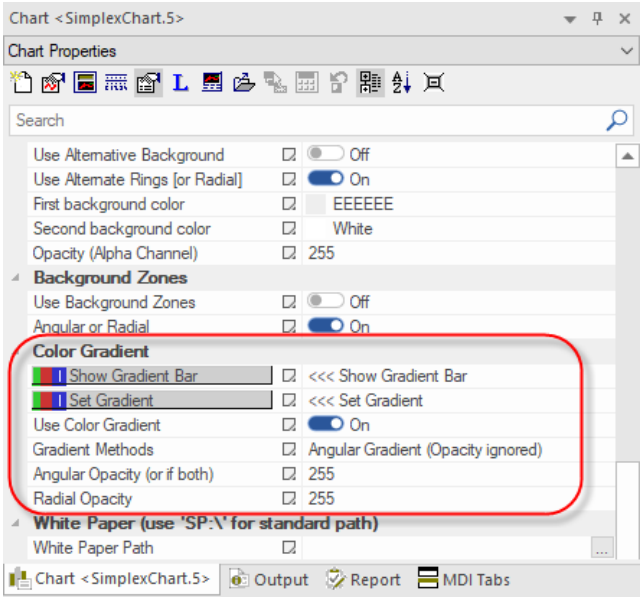
V21

The latest version of *SimplexNumerica* features special ***Polar Charts*** with an adjustable color gradient.



Info:

You can activate the Color Gradient dialogbox in the *Chart Properties* (please see the button on the left called *Show Gradient Bar*).



When you have finished the color adjustments, then press *Set Gradient* to apply these settings to the chart.

To switch on/off the color gradient use the property *Use Color Gradient*.

There are distinctive gradient methods that you can use. Select the appropriated one in the combobox underneath.

The opacity of the color can be tuned separately for angular and radial directions.

Gradient Polar Chart

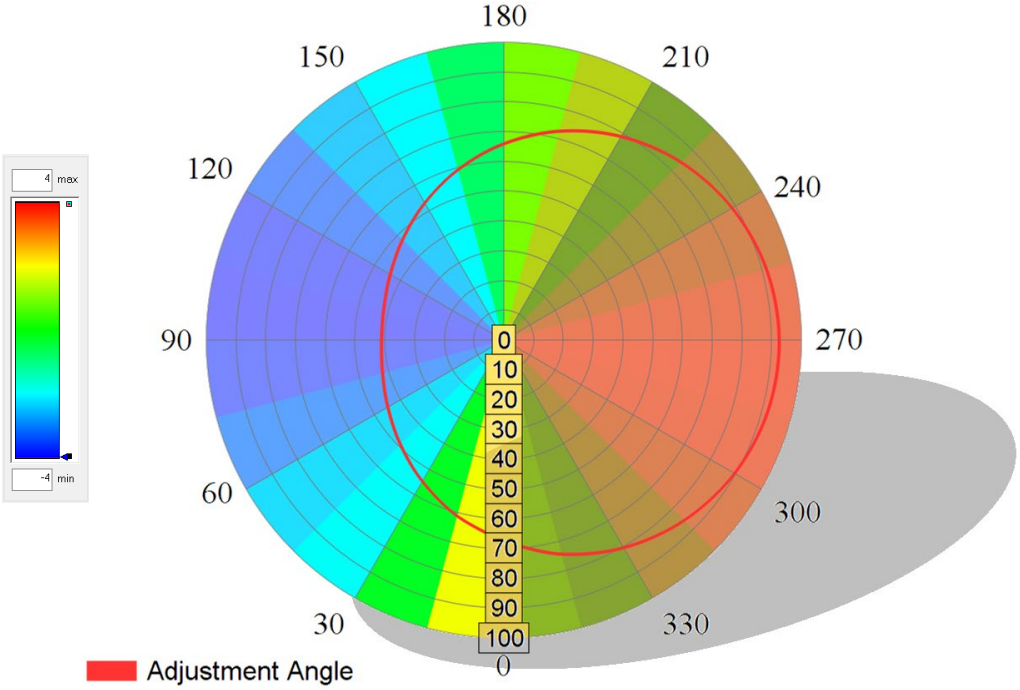
Angular Continuous Gradient

In the Thumbnail Window, rubric Poar Chart you will find samples for Gradient Polar Charts. Please have a look.

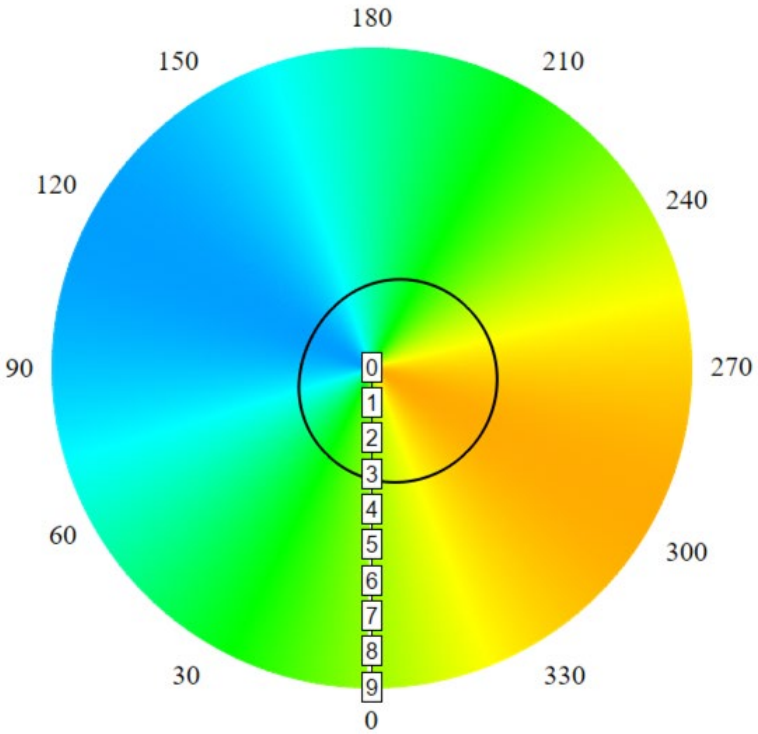
With these charts it is possible to additionally represent the values of the graph in the polar diagram by the corresponding color.

The value of the graph is compared to a color scale and the corresponding angular segment is filled with the determined color.

A discrete gradient is displayed here in this picture.



The display can also be stepless by selecting a sufficiently high number of segments – as the next picture shows:



Gradient Polar Chart

Creating the plot

☒ View	Adjustment Angle SampleData		
Legend	G0.x	G0.y	G0.z
1	67,625	0,000	15859456,0000
2	60,934	15,000	65315,000000
3	54,635	30,000	65529,000000
4	49,157	45,000	2088959,00000
5	44,873	60,000	6071295,00000
6	42,076	75,000	7899135,00000
7	40,956	90,000	8290815,00000
8	41,590	105,000	8094975,00000
9	43,934	120,000	6789375,00000
10	47,828	135,000	3263999,00000
11	53,007	150,000	65279,000000
12	59,119	165,000	65381,000000

The presented table on the left shows the data of the chart.

In the column G0.x the values to be displayed are entered (so the deflection of the diagram), in the column G0.y the corresponding angle position.

Column G0.z is used for the color representation and does not have to be filled in manually.

See the property window: To show and edit the color scale, make a click on *Chart Properties* → *Color Gradient* → *Show Gradient*. The chart values (column G0.x) are adjusted at this color scale.

A click on the button *Chart-Eigenschaften* → *Color Gradient* → *Set Gradient* then enters the corresponding values in the G0.z column, creating the desired color representation.

In case of a large number of segments, it is recommended to make the entry automatically. The following program code can be used for this purpose:

```
Chart ch = app.GetChartByName("My beloved Chart");
ch.SetDataX(i, 0, result); // i=row; 0=first graph; result=einzutragender_Datenwert
```

`SetDataX` refers to the first column of the table shown above. If the second or third column is to be changed, `SetDataY` or `SetDataZ` can be used in the same way.

i indicates the line in the above table in which the entry is to be made.

0 denotes the zeroth graph of the corresponding diagram. Several graphs can be displayed simultaneously in one diagram. The first graph then receives the column designations G1.x; G1.y; G1.z. If the entry is to be made in the first (instead of the zeroth) graph, a 1 must be entered here.

`result` represents the chart value to be entered.

To update the color representation afterwards, the use again *Set Gradient*. However, this can also be done automatically. Here is a set of useful commands for this:

```
Chart ch = app.GetChartByName("MeinDiagramm");

ch.SetActiveGraph(3);
ch.SelectPropertyGroup("Chart Properties");
ch.SetProperty(idRadar_UseColorPolarGradient, true);
ch.SetProperty(idButtonShowColorGradient, true);
ch.SetProperty(idButtonSetColorPolarGradient, true);

app.UpdateWindows();
```

Gradient Polar Chart

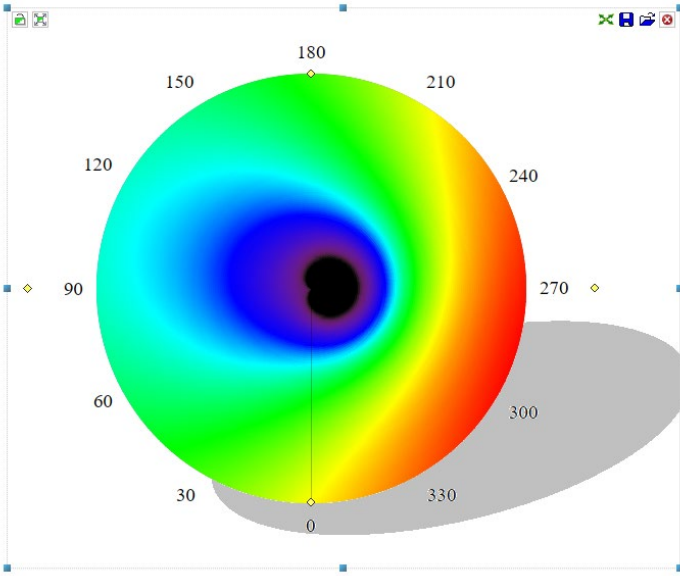
Radial Continuous Gradient

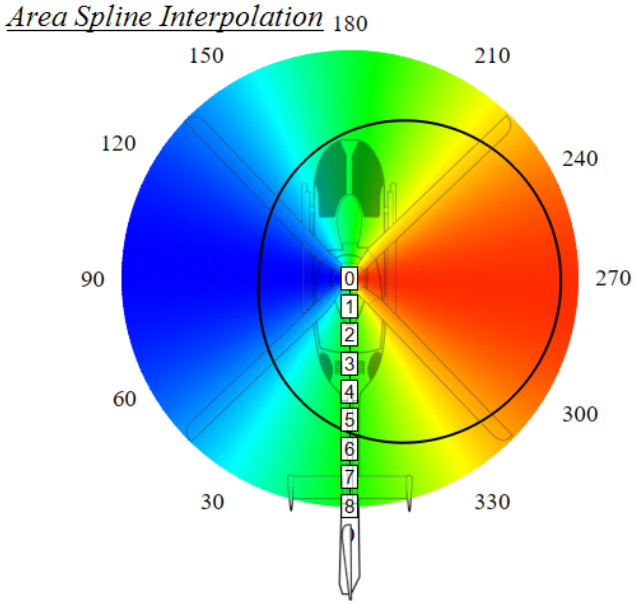
Here we will explain a Polar diagram with radial changes and with a Continuous Gradient.

The functionality described in previous chapter could be extended by allowing the display of radial color changes.

For this purpose, any number of the diagrams described above can be created, each forming a ring segment. With a sufficiently high number of ring and angle segments, the color mapping is continuous in every direction.

Possible applications of this plot are the representation of various parameters, e.g. inflow conditions at rotating components such as propellers, rotors or turbines or e.g. the flow through pipes.





Creation of the plot

The plot is created in a similar way as described above for angular, but here for radial direction.

The number of graphs determines the number of ring segments for the color representation. The colors within a ring are created in the same way with a *Color Gradient*.

The x-columns G0.x, G1.x etc. represent the diagram values to be displayed in radial direction.

The y-columns G0.y, G1.y etc. represent the corresponding angular positions.

G0.z, G1.z, etc. represent the segment width.

Attention:
Since the example uses 1° steps, the width of the segment must be 0.5° in each direction. Otherwise, the color segments will overlap.

Here the data table (GraphTable) for this example.

Gradient Polar Chart

☒ View	Rose Data 1 SampleData			Rose Data 2 SampleData			Rose Data 3 SampleData			Rose Data 4 SampleData		
Legend	G0.x	G0.y	G0.z	G1.x	G1.y	G1.z	G2.x	G2.y	G2.z	G3.x	G3.y	G3.z
1	-0,018	0,000	0,500000	0,001	0,000	0,500000	-0,014	0,000	0,500000	-0,053	0,000	0,500000
2	-0,014	1,000	0,500000	-0,020	1,000	0,500000	0,044	1,000	0,500000	-0,011	1,000	0,500000
3	0,025	2,000	0,500000	0,037	2,000	0,500000	0,031	2,000	0,500000	0,042	2,000	0,500000
4	-0,024	3,000	0,500000	-0,018	3,000	0,500000	-0,028	3,000	0,500000	0,070	3,000	0,500000
5	0,027	4,000	0,500000	-0,035	4,000	0,500000	-0,058	4,000	0,500000	0,061	4,000	0,500000
6	-0,034	5,000	0,500000	0,026	5,000	0,500000	-0,033	5,000	0,500000	0,024	5,000	0,500000
7	0,026	6,000	0,500000	0,046	6,000	0,500000	0,020	6,000	0,500000	-0,023	6,000	0,500000
8	0,011	7,000	0,500000	-0,002	7,000	0,500000	0,061	7,000	0,500000	-0,064	7,000	0,500000
9	-0,042	8,000	0,500000	-0,051	8,000	0,500000	0,070	8,000	0,500000	-0,087	8,000	0,500000
10	-0,002	9,000	0,500000	-0,051	9,000	0,500000	0,045	9,000	0,500000	-0,090	9,000	0,500000
11	0,047	10,000	0,500000	-0,007	10,000	0,500000	0,002	10,000	0,500000	-0,074	10,000	0,500000
12	0,026	11,000	0,500000	0,043	11,000	0,500000	-0,043	11,000	0,500000	-0,045	11,000	0,500000
13	-0,032	12,000	0,500000	0,070	12,000	0,500000	-0,076	12,000	0,500000	-0,008	12,000	0,500000
14	-0,058	13,000	0,500000	0,062	13,000	0,500000	-0,091	13,000	0,500000	0,030	13,000	0,500000
15	-0,034	14,000	0,500000	0,029	14,000	0,500000	-0,086	14,000	0,500000	0,066	14,000	0,500000
16	0,016	15,000	0,500000	-0,016	15,000	0,500000	-0,066	15,000	0,500000	0,094	15,000	0,500000
17	0,058	16,000	0,500000	-0,056	16,000	0,500000	-0,035	16,000	0,500000	0,114	16,000	0,500000
18	0,071	17,000	0,500000	-0,083	17,000	0,500000	0,001	17,000	0,500000	0,126	17,000	0,500000
19	0,053	18,000	0,500000	-0,091	18,000	0,500000	0,038	18,000	0,500000	0,128	18,000	0,500000
20	0,016	19,000	0,500000	-0,083	19,000	0,500000	0,070	19,000	0,500000	0,123	19,000	0,500000
21	-0,026	20,000	0,500000	-0,061	20,000	0,500000	0,097	20,000	0,500000	0,111	20,000	0,500000
22	-0,063	21,000	0,500000	-0,030	21,000	0,500000	0,115	21,000	0,500000	0,093	21,000	0,500000
23	-0,085	22,000	0,500000	0,004	22,000	0,500000	0,126	22,000	0,500000	0,071	22,000	0,500000
24	-0,091	23,000	0,500000	0,039	23,000	0,500000	0,128	23,000	0,500000	0,047	23,000	0,500000
25	-0,082	24,000	0,500000	0,070	24,000	0,500000	0,124	24,000	0,500000	0,021	24,000	0,500000
26	-0,061	25,000	0,500000	0,095	25,000	0,500000	0,113	25,000	0,500000	-0,006	25,000	0,500000
27	-0,032	26,000	0,500000	0,113	26,000	0,500000	0,098	26,000	0,500000	-0,032	26,000	0,500000
28	0,001	27,000	0,500000	0,124	27,000	0,500000	0,078	27,000	0,500000	-0,058	27,000	0,500000