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Pareto analysis of numeric values within a

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PARETO ANALYSIS OF NUMERIC VALUES WITHIN A SPREADSHEET PROGRAM

Technical task:

The task of the technical innovation is to increase the flexibility of analyzing numerical values within a spreadsheet program.

Initial situation:

A spreadsheet program (such as Microsoft Excel) works with two-dimensional tables that have rows and columns. A cell is uniquely addressed via a defined row and column. A marker may include one or any selection of cells.

In practice, for example, there are several cells with numerical values. One now wants to perform a so-called Pareto analysis of the numerical values.

The Pareto analysis is also known in the form as „80/20 rule“. Hereby the statement is made that 80% of the total sum of 20% of the occurrences be formed.

For illustration, the following example is given, see Fig. 1-4.

Solution:

An additional functionality for the spreadsheet program offers a Pareto analysis on.

As an idea, the following Pareto analysis of marked numerical values is presented.

The analysis takes place automatically and requires, in addition to the marking of the numeric values to be analyzed, the specification of the value threshold. By this is meant the proportion of value at which, after the cumulation of the highest values, the value threshold has been made as a percentage of the total value or exceeded for the first time. In the above example this was the threshold „80%“.

For illustration, the same example from above is used.

The analysis function generates the following result, see Fig. 5.

The line in the row highlighted in yellow shows that 10 numerical values in the interval from 91 to 42 and the sum of 720 give 82.2% of the total 876 (Group A). Below are the data of the remaining values listed (group B).

The illustration also shows the total 876, the complete value interval from 91 to 5 and the number of all numerical values (occurrences).

This list is optionally output in the spreadsheet program on a worksheet.

An additional function optionally allows the marking of the groups A or B, whereby the numerical values within the group are marked.

By way of example, the numerical values of group B are marked here, see Fig. 6.

Additional functions can now be called for the selected cells.

This, in turn, may be another (deeper) Pareto analysis.

For this purpose, the following list is given in the example, see Fig. 7.

With this option, for example, an ABC prioritization can be performed.

The first Pareto analysis divides the numeric values into groups A and B. Group A is the most important and is assigned the highest priority (= A). As described in the example, a second Pareto analysis is carried out for group B. The resulting group A represents the middle priority (= B). The remaining numerical values are assigned to the priority C.

For clarity, this is shown below in colors (priority A = green, priority B = yellow, priority C = red), see Fig. 8.

Advantages:

- The described function enables a fast Pareto analysis of numeric values. In particular, a deeper analysis of the groups enables a targeted and efficient analysis of the data.

Possible application:

- Applicable in spreadsheet programs.

Stand der Technik

Zur Illustration sei folgendes Beispiel gegeben:

Es liegen folgende numerische Werte vor.

	A	B	C
1			
2		56	86
3		32	21
4		48	91
5		30	42
6		75	5
7		74	76
8		85	29
9			21
10			87
11			18
12			

Abb. 1

Im Folgenden ist die manuelle Vorgehensweise beschrieben, wie innerhalb Excel eine Pareto-Analyse erfolgt:

1. Numerische Werte in eine Spalte bringen und absteigen sortieren

	A	B
1		
2		91
3		87
4		86
5		85
6		76
7		75
8		74
9		56
10		48
11		42
12		32
13		30
14		29
15		21
16		21
17		18
18		5

Abb. 2

2. Bildung der Kumulation der Reihe in Spalte C und Bildung des Prozentanteils zum Gesamtwert in Spalte D. Die einzutragenden Formeln sind im rechten Schaubild dargestellt.

Stand der Technik/ Technische Neuerung

A	B	C	D
1			
2	91	91	10%
3	87	178	20%
4	86	264	30%
5	85	349	40%
6	76	425	49%
7	75	500	57%
8	74	574	66%
9	56	630	72%
10	48	678	77%
11	42	720	82%
12	32	752	86%
13	30	782	89%
14	29	811	93%
15	21	832	95%
16	21	853	97%
17	18	871	99%
18	5	876	100%

A	B	C	D
1			
2	91	=B2	=C2/\$C\$18
3	87	=B3+C2	=C3/\$C\$18
4	86	=B4+C3	=C4/\$C\$18
5	85	=B5+C4	=C5/\$C\$18
6	76	=B6+C5	=C6/\$C\$18
7	75	=B7+C6	=C7/\$C\$18
8	74	=B8+C7	=C8/\$C\$18
9	56	=B9+C8	=C9/\$C\$18
10	48	=B10+C9	=C10/\$C\$18
11	42	=B11+C10	=C11/\$C\$18
12	32	=B12+C11	=C12/\$C\$18
13	30	=B13+C12	=C13/\$C\$18
14	29	=B14+C13	=C14/\$C\$18
15	21	=B15+C14	=C15/\$C\$18
16	21	=B16+C15	=C16/\$C\$18
17	18	=B17+C16	=C17/\$C\$18
18	5	=B18+C17	=C18/\$C\$18

Abb. 3

Im Ergebnis wird sichtbar, dass die 80%-Wertanteile erst mit dem numerischen Wert „42“ knapp überschritten werden.

A	B	C	D
1			
2	91	91	10%
3	87	178	20%
4	86	264	30%
5	85	349	40%
6	76	425	49%
7	75	500	57%
8	74	574	66%
9	56	630	72%
10	48	678	77%
11	42	720	82%
12	32	752	86%
13	30	782	89%
14	29	811	93%
15	21	832	95%
16	21	853	97%
17	18	871	99%
18	5	876	100%

A	B	C	D	E	F	G
1						
2	Wert	Wert	Vorkommen	Vorkommen	Von	Bis
3	[%]	Zahl	[%]	Zahl	Zahl	Zahl
4	Gesamt	100%	876	100%	17	91
5	A	82,2%	720	58,8%	10	91
6	B	17,8%	156	41,2%	7	42

Abb. 5

Abb. 4

A	B	C
1		
2	56	86
3	32	21
4	48	91
5	30	42
6	75	5
7	74	76
8	85	29
9		21
10		87
11		18

Abb. 5

A	B	C	D	E	F	G
1	Wert	Wert	Vorkommen	Vorkommen	Von	Bis
2	[%]	Zahl	[%]	Zahl	Zahl	Zahl
3	Gesamt	100%	156	100%	7	32
4	A	85,3%	133	71,4%	5	32
5	B	14,7%	23	28,6%	2	21

Abb. 6

Technische Neuerung

A	B	C
1		
2	56	86
3	32	21
4	48	91
5	30	42
6	75	5
7	74	76
8	85	29
9		21
10		87
11		18

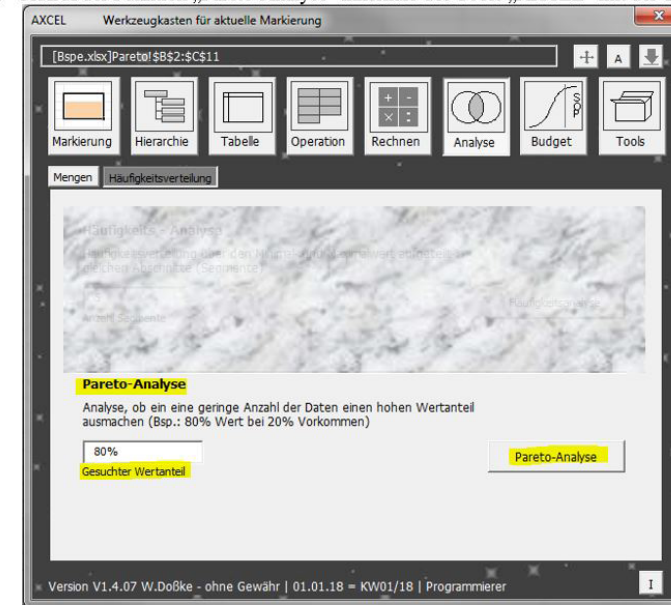
Abb. 7

Beispielablauf:

a) Gegeben sei das Beispiel von oben:

A	B	C
1		
2	56	86
3	32	21
4	48	91
5	30	42
6	75	5
7	74	76
8	85	29
9		21
10		87
11		18

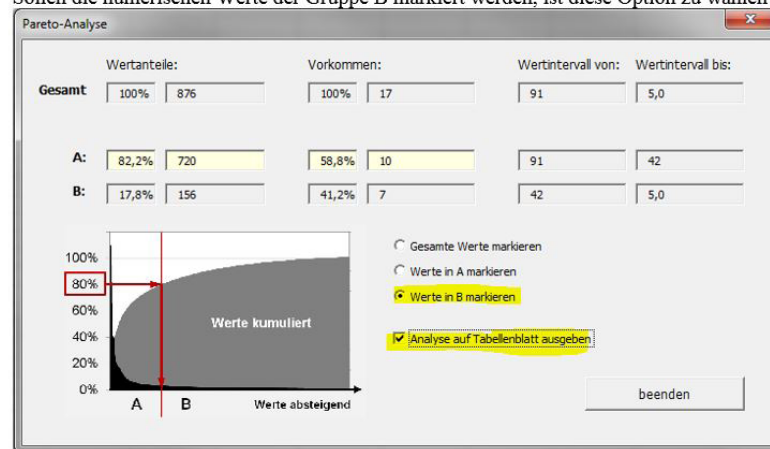
b) Aufruf der Funktion „Pareto-Analyse“ innerhalb des Tools „AXCEL“ mit der Tastenkombination STRG+d:



Vor der Analyse wird der Nutzer noch zum gesuchten Wertanteil abgefragt.

Technische Neuerung

- c) Im Ergebnis liegt die fertige Analyse vor.
Die Daten können auf einem separaten Tabellenblatt ausgegeben werden.
Sollen die numerischen Werte der Gruppe B markiert werden, ist diese Option zu wählen (gelb hinterlegt).



- d) Hier sind im Ergebnis nun die numerischen Werte der Gruppe B markiert:

	A	B	C
1			
2		56	86
3		32	21
4		48	91
5		30	42
6		75	5
7		74	76
8		85	29
9			21
10			87
11			18

- e) Die tiefere Analyse erfolgt über den gleichen Dialogvorgang, da sich die Analyse auf die markierten Zellen bezieht.