AGOPcalc: Calculator for Analysis and Design of Aggregation Operators

AGOPcalc is a collection of calculators that are designed to help professional evaluators to develop generalized conjunction/disjunction and partial absorption aggregators. It supports the following eight functions:

1. **Computation of penalty and reward for a given partial absorption function**
2. **Computing parameters of a partial absorption from desired penalty/reward**
3. **Verbalized selection of parameters of generalized conjunction/ disjunction**
4. **Weight verbalizer - verbal interpretation of an arbitrary set of weights**
5. **AHP calculator - computing weights based on the analytic hierarchy process**
6. **A simple weight calculator**
7. **Calculator of andness, orness and power mean exponent**
8. **Detailed analysis and synthesis of aggregation operators using ANSY**

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PA  -  The Partial Absorption function

x ----------+-------------.
            |             |
            | W1          | W2
            |             |
    1-W1  .---.   1-W2  .---.
y ------->| q |-------->| r |-----> z
          `---'         `---'

x  = main input (either mandatory or sufficient)
y  = optional input, used to produce a desired
     (minor) increment or decrement of z
W1 = weight of the input aggregator
W2 = weight of the output aggregator
q  = exponent of the input aggregator
r  = exponent of the output aggregator
     If r<1 then PA=CPA (mandatory/optional)
     If r>1 then PA=DPA (sufficient/optional)

Enter W1[%]  W2[%]  q  r : 50 50 1 4

Penalty (const.) = 14.6262 %    (Low)
Reward (average) = 35.5934 %    (MedHi)
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```
no - none
vl - very low
lo - low
ml - medium-low
me - medium
mh - medium-high
hi - high
vh - very high
ex - extreme
```

1. Lowest
2. Slightly above lowest
3. Very low
4. Slightly below low
5. Low
6. Slightly above low
7. Medium-low
8. Slightly below medium
9. Medium
10. Slightly above medium
11. Medium-high
12. Slightly below high
13. High
14. Slightly above high
15. Very high
16. Slightly below highest
17. Highest

TABLE OF THE ANALYZED DPA FUNCTION

Parameters of the PA function: W1=50%, W2=50%, q=1 (A), r=4 (DA)
Penalty = 14.6262% (Low) Average Reward = 35.5934% (MedHi)
Horizontal values: sufficient input x. Vertical values: optional input y

Penalty:	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15%
y x:	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100%
0%	0	4	9	13	17	21	26	30	34	38	43	47	51	55	60	64	68	73	77	81	85
5%	2	5	9	13	17	22	26	30	34	39	43	47	52	56	60	64	69	73	77	81	86
10%	4	7	10	14	18	22	26	31	35	39	43	48	52	56	60	65	69	73	77	82	86
15%	6	9	11	15	19	23	27	31	35	40	44	48	52	57	61	65	69	74	78	82	86
20%	8	11	13	16	20	24	28	32	36	40	44	49	53	57	61	65	70	74	78	82	87
25%	11	13	15	18	21	25	29	33	37	41	45	49	53	58	62	66	70	74	79	83	87
30%	13	15	17	20	23	26	30	34	38	42	46	50	54	58	62	67	71	75	79	83	88
35%	15	17	19	22	25	28	31	35	39	43	47	51	55	59	63	67	71	76	80	84	88
40%	17	19	21	24	26	29	33	36	40	44	48	52	56	60	64	68	72	76	80	85	89
45%	19	21	23	26	28	31	34	38	41	45	49	53	57	61	65	69	73	77	81	85	89
50%	21	23	25	28	30	33	36	39	43	46	50	54	58	62	66	70	74	78	82	86	90
55%	23	25	27	30	32	35	38	41	44	48	51	55	59	63	67	71	75	79	83	87	91
60%	25	27	29	32	34	37	40	43	46	49	53	56	60	64	68	72	75	79	84	88	92
65%	27	29	32	34	36	39	41	44	47	51	54	58	61	65	69	73	77	80	84	88	92
70%	29	32	34	36	38	41	43	46	49	52	56	59	63	66	70	74	78	82	85	89	93
75%	32	34	36	38	40	43	45	48	51	54	57	61	64	68	71	75	79	83	86	90	94
80%	34	36	38	40	42	45	47	50	53	56	59	62	66	69	73	76	80	84	88	91	95
85%	36	38	40	42	44	47	49	52	55	58	61	64	67	71	74	78	81	85	89	93	96
90%	38	40	42	44	46	49	51	54	57	59	62	65	69	72	75	79	83	86	90	94	98
95%	40	42	44	46	49	51	53	56	58	61	64	67	70	74	77	80	84	88	91	95	99
100%	42	44	46	48	51	53	55	58	60	63	66	69	72	75	79	82	85	89	93	96	100
y x:	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100%
Reward :								84	65	51	40	32	25	20	16	12	9	7	5	3	1	0%
Abs[%] :	42	39	36	33	31	28	25	23	20	18	16	14	12	10	9	7	5	4	3	1	0%

1. LINEAR SHIFT MODEL (Properties: W=A/L+c, not always applicable)

W1[%]	W2[%]	W3[%]	W4[%]	Sigma[%]
48.44	29.69	17.19	4.69	82.35

Y = (0.48*X1^0.17 + 0.30*X2^0.17 + 0.17*X3^0.17 + 0.05*X4^0.17)^6.02

2. PROPORTIONAL SCALING MODEL (Properties: W=c*A, sigma_w = sigma_a)

W1[%]	W2[%]	W3[%]	W4[%]	Sigma[%]
34.15	26.83	21.95	17.07	33.33

Y = (0.34*X1^0.17 + 0.27*X2^0.17 + 0.22*X3^0.17 + 0.17*X4^0.17)^6.02

For additional information please contact us at info@seas.com.