## TRIZ Contradiction-Matrix

C	ontradiction-Matrix	ature mo	ind stati	iect movimb stat	viect our	ional, mo	wint station	t need /	nten.	res have the	e ositile en	ath of act	obly act	ryou reratur	ioning gyb	niect ener	ary obliner	150	er Substilling	m, or	d'sub at	iits ent	at ring P.	ted tors general	tact anutt	Opera	dieb	NOT VE COMP	of det es	sur autor	uctivi
lmn	according to G. Altshuller	morsing fee Meight of The	Agrico. of	netrofit Length of	Wes of the	ea of state Volume of I.	Little or other	torce 10	stress 0	Grahitey o. co	mily structured to the structure of the	ation mount	stion station.	Territ Hurring	se denero	Se static	386 40	<b>10550</b>	Joss of 1, 1055 of 1,	1055 O	anity Refl.	Aeastreem M	nutactur Object afte	Object barret	tase of the	of Lase	Adaptabili	Device Diffici	and fixe	ent of t	rodu
1	Weight of moving object	¥ -	15, 8, 29,34	29, 17		29, 2, 40, 28	2, 8, 15, 38	8, 10, 10, 3 18, 37 37, 4	6, 10, 14, 0 35, 40	1, 35, 28, 2 19, 39 18, 4	7, 5,34, 31,35	-	6, 29, 4, 38	19, 1, 32 35, 34	12, 31	12, 36	6, 6, 2, 34, 1 19	5, 35, 3, 31	10, 24, 10, 35, 35 20, 28		1, 3, 11, 28, 27, 27 35, 26	28, 35, 26, 18	22, 21, 18, 27	2, 35, 31, 27, 28 39 1, 36	, 35, 3, 2, 2, 24 28	27, 29, 3,11 15,	5, 26, 8 36,	30, 28,29, ,34 26,32	26, 35 18, 19	35, 3, 24, 37	01 - Se
2	Weight of stationary object	- 9	-	10, 1, 29, 35	35, 30, 13, 2	5, 35, 14, 2	-	8, 10, 13, 2 19, 35 10, 1		26, 39, 28, 1 1, 40 10, 2	-	2, 27, 19, 6	28, 19, 32, 22		18, 19 28, 1		9, 18, 19, 2 28, 15	5, 8, 13, 30		19, 6, 18, 26	10, 28, 18, 26, 8, 3 28	, 10, 1, 35, 17	2, 19, 22, 37	35, 22, 1, 39 28, 1,	6, 13, 1, 2	27, 19, 1 3, 11 29	- 1	10, 25, 28, , 39 17, 15	12. 26. 351	1, 28, 15, 35	02 - Ta
3	Length of moving object	8, 15, 29, 34	+	- 15, 17,	4 -	7, 17, 4, 35	13, 4, 8 1	7, 10, 4 1, 8, 3	1, 8, 10	, 1, 8, 15, 8, 3 34 29, 3	19	-	10, 15, 19	32 8, 3	5, 24 -	1, 35	7, 2, 35, 39	4, 29, 23, 10	1, 24 15, 2, 29	29, 35	10, 14, 29, 40 28, 32,	4 10, 28, 29, 37	1, 15, 17, 24	17, 15 1, 29, 1	7 15, 29, 35, 4 1, 2	28, 10 14, 1				14, 4, 28, 29	03 - Lo
4	Length of stationary object	35, 28, 40, 29	-	-	17, 7, 10, 40	- 35, 8, 2,14	-	28, 10 1, 14,	35 13, 14, 15, 7	39, 37, 15, 1 35 28, 2	-	1, 10, 35	3, 35, 38, 18	3, 25		12,8	6, 28	10, 28, 24, 35	24, 26, 30, 29, 14		15, 29, 28 32, 28,	3 2, 32, 10	1, 18	15, 17 27	2, 25	3 1,3	35 1,2	26 26		30, 14, 7, 26	04 - As
5	Area of moving object	2, 17, 29, 4	14, 15, 18, 4	- +	-	7, 14, 17, 4		19, 30, 10, 1 35, 2 36, 2	5, 5, 34, 8 29, 4	1 1	. 63	-	2, 15, 16	15, 32, 19, 13	32 -		0, 15, 17, 8 30, 26		30, 26 26, 4	29, 30, 6, 13	29,9 26,28 32,3		22, 33, 28, 1	17, 2, 18, 13, 1, 39 26, 24		, 13, 0, 1 15,	30 14, 1	1 131 1		10, 26, 34, 2	05 - Me
6	Area of stationary object	- 30, 2, 14, 18	-	26, 7, 9,	+	-		1, 18, 10, 1 35, 36 36, 3		2, 38 40	-	2, 10, 19, 30	35, 39, 38			17, 32	2 17, 7, 30	10, 14, 18, 39	30, 16 10, 35, 4, 18	2, 18, 40, 4	32, 35, 26, 28, 40, 4 32, 3		27, 2, 39, 35	22, 1, 40 40, 16	16, 4	16 15,	16 1, 18	8, 36 2, 35, 30, 18		10, 15, 17, 7	06 - Ur
7	Volume of moving object	2, 26, 29, 40	1, 7, 4, 35	- 1,7,4 17	,	-		15, 35, 6, 35 36, 37 36, 3		28, 10, 9, 1- 1, 39 15,		-	34, 39, 10, 18	2, 13, 10 3	5 -		5, 7, 15, 8 13, 16		2, 22 2, 6, 34 10	29, 30, 7	14, 1, 25, 26 40, 11 28	, 25, 28, 2, 16	22, 21, 27, 35	7, 2, 40, 1 29, 1, 4	0 15, 13, 30, 12	10 15,	29 26	5, 1 29, 26, 4	35, 34, 1 16, 24	10, 6, 2,	07 - "N
8	Volume of stationary object	- 35, 10, 19, 14	19, 14	35, 8, 2, 14		- #	- 2	2, 18, 37 24, 3	5 7, 2, 35	34, 28, 9, 14 35, 40 17, 1		35, 34, 38	35, 6, 4			30,6		10, 39, 35, 34	35, 16, 32 18	35, 3	2, 35, 16	35, 10, 25	34, 39, 19, 3 27	0, 18, 35, 4		1	1,3	31 2, 17, 26	l I	35, 37, 10, 2	08 - An
9	Speed	2, 28, 13, 38	13, 14, 8	29, 30 34	-	7, 29, 34 -		13, 28, 6, 18 15, 19 38, 4	- 1	28, 33, 8, 3, 3 1, 18 14		-	28, 30, 36, 2	10, 13, 8, 19 35	_	19, 35 38, 2	5, 14, 20, 2 19, 35		13, 26	10, 19, 29, 38	11, 35, 28, 32 27, 28 1, 24		1, 28, 35, 23	2, 24, 35, 35, 13 21 8, 1	, 32, 28, 3 13, 12 28		- 1	28, 3,34, 34 27,16	10, 18		09 - Pr
10	Force (Intensity)	8, 1, 37, 18, 13, 18 1, 28	9,36	28, 10 15	36, 37	15, 9, 2, 36, 12, 37 18, 37		+ 18, 2 11	1, 10, 35, 40, 34	1 1	19.2		35, 10, 21	- 1	17, 1, 16, 0 36, 37			8, 35, 40, 5	10, 37, 36	14, 29, 18, 36	3, 35, 10, 13, 21 23, 24		1, 35, 40, 18	13, 3, 36, 15, 37 24 18, 1	, 1, 28, 3, 25 15,	1, 11 15, 1 18,		35, 36, 37, , 18 10, 19	7 35 1	3, 28, 35, 37	10 - Pr
11	Stress or pressure	10, 36, 13, 29, 37, 40 10, 18	35, 10, 36	<del>                                     </del>	36,37	16 35 101 35 24	6, 35, 36	36, 35, 21	15, 10	35, 33, 9, 18 2, 40 40		7	35, 39, 19, 2	- 10	_	10, 35 14		10, 36, 3, 37	37, 36, 4	10, 14,	10, 13, 19, 35 6, 28, 2	5 3,35	22, 2, 37	2, 33, 27, 18 1, 35, 1	6 11	2 35	5 19, 1	1, 35 2, 36, 37	1 35 24 1	10, 14, 35, 37	11 - Be
12	Shape	8, 10, 15, 10, 29, 40 26, 3	29, 34, 5, 4	13, 14, 5, 34, 4 10, 7 10	4,	14, 4, 15, 22 7, 2, 35	34, 18	35, 10, 34, 1 37, 40 10, 1		33, 1, 30, 1 18, 4 10, 4			22, 14, 19, 32	13, 15, 2, 6 32 1		4, 6, 2	2 14	35, 29, 3, 5	14, 10, 34, 17	36, 22	10, 40, 16 28, 32,	1 32, 30,	22, 1, 2, 35	35, 1 1, 32, 17, 28		13, 1 1, 15	. 291	29, 15, 13, 28 39	115 1 371	17, 26, 34, 10	12 - Eq
13	Stability of the object's composition	21, 35, 26, 39, 2, 39 1, 40	1,28	37 2,11,1		28, 10, 34, 28, 19, 39 35, 40			40 22, 1, 18, 4	+ 17,9,		39, 3, 35, 23	35, 1, 32	32, 3, 27, 16	19 27, 4, 29, 18				35, 27	15, 32, 35	13	18	35, 24, 30, 3 18	5, 40, 27, 39 35, 19		35, 35, 3 0, 16 34,		35, 35, 22, , 26 39, 23	1 1 8 351	23, 35, 40, 3	13 - "T
14	Strength	1, 8, 40, 40, 26, 15 27, 1	1, 15, 8, 35	15, 14, 3, 34, 28, 26 40, 29		3 10, 15, 9, 14, 14, 7 17, 15					27, 3, 26	5	30, 10, 40	1 35 19 1	35, 0 35	10, 26 35, 28		35, 28, 31, 40	29, 3, 28, 10	29, 10, 27	11,3 3,27,1	6 3, 27	18, 35, 37, 1	5, 35, 22, 11, 3, 2 10, 32	32, 40, 25, 2 27,	11, 3 15, 3	371	13, 27, 3, , 28 15, 40	1 15 1	29, 35, 10, 14	14 - Sp
15	Duration of action of moving object	19, 5, 34, 31	2, 19, 9	- 3, 17, 1	19 -	10, 2, 19, 30	3, 35, 5 1	9, 2, 16 19, 3,	27 14, 26, 28, 25	13, 3, 35 27, 3,	10 +	-	19, 35, 39	2, 19, 4, 28 35 35		19, 10 35, 38		28, 27, 3, 18		3, 35, 10, 40	11, 2, 13 3	3, 27, 16, 40	22, 15, 33, 2 28	1, 39, 16, 22 27, 1,		1, 10, 27		, 4, 19, 29, , 15 39, 35	6, 10	35, 17, 14, 19	15 - Dy
16	Duration of action by stationary object	- 6, 27, 19, 16	-	1, 40, 35 -		- 35, 34, 38	-			39, 3, 35, 23	-	*	19, 18, 36, 40			16		27, 16, 18, 38	10 28, 20, 10, 16	3, 35, 31	6, 40 24		17, 1, 40, 33	22 35, 10	1	1 2		25, 34, 6, 35	1	20, 10, 16, 38	16 - Pa
17	Temperature	36,22, 22,35, 6,38 32	15, 19, 9	15, 19, 9 39, 18		34, 39, 40, 18 35, 6, 4	2, 28, 36, 30	35, 10, 35, 3 3, 21 19, 2	9, 14, 22, 2 19, 32	1, 35, 32 10, 3 22, 4	0, 19, 13, 10 39	19, 18, 36, 40	***	32, 30, 19, 21, 16 3,		2, 14 17, 2!	5 35, 38			3, 17, 30, 39	19, 35, 32, 19 3, 10 24	24	22, 33, 35, 2	22, 35, 2, 24 26, 27	26, 27 4, 1	10, 16 2, 18	, 27 2, 17	/ 161	26, 2, 19, 16	15, 28, 35	17 - Ar
18	Illumination intensity	19, 1, 32 2, 35, 32	19, 32, 16	26		2, 13, 10	19	6, 19, 6		32, 3, 27 35, 1			32, 35, 19	<b>#</b> 32,	1, 19 32, 35 1, 15	32	1,6	13, 1	1, 6 19, 1, 26, 17	1, 19	11, 15, 32	3, 32	15, 19	5, 19, 32, 19, 35 39 28, 26	19 13	3, 16		2, 13 32, 15	2, 26, 10 2	2, 25, 16	18 - M
19	Use of energy by moving object	12,18,2 8,31	12, 28	- 15, 19 - 25	-	35, 13, 18	8, 35, 35	16, 26, 23, 1 21, 2 25	12, 2, 2	19, 13, 5, 19 17, 24 35	9, 28, 35, 6, 18	-	19, 24, 3, 14	2, 15, 19	· .	6, 19 37, 18				34, 23, 16, 18		2	1, 35, 6, 27	2, 35, 6 28, 26		15, 15, 1 7, 28 13,			32, 2	12, 28, 35	19 - Pe
20	Use of energy by stationary object	- 19, 9, 6, 27	-	-		-		36, 37		27, 4, 29, 18 35				19, 2, 35, 32				28, 27, 18, 31		3, 35, 31	10, 36, 23		10, 2, 22, 37 1					19, 35, 16, 25		1, 6	20 - Co
21	Power	8, 36, 19, 26, 38, 31 17, 27	35, 37	19, 38		35, 6, 38 30, 6, 2		26, 2, 22, 1 36, 35 35	0, 29, 14, 2, 40	35, 32, 26, 1 15, 31 28			2, 14, 17, 25	16, 6, 19	, 6, 37	*	20 30	18, 38			19, 24, 26, 31 32, 15,	2 32, 2		34	, 26, 35, 3. 10 10	5, 2, 19, 3 0, 34 34		, 34 16	28, 2, 17	28, 35, 34	21 - Sk
22	Loss of Energy	15, 6, 19, 6, 19, 28 18, 9	7, 2, 6, 13	6, 38, 7	5, 17, 7, 30, 18	7, 18, 23 7	38	36, 38		14, 2, 39, 6			19, 38, 7	1, 13, 32, 15		3, 38	, 1000	35, 27, 2, 37		7, 18, 25			21, 22, 33, 2	21, 35, 2,	35, 32, 1 2		7, 2	15, 23	2	28, 10, 29, 35	22 - "B
23	Loss of substance	<del>                                     </del>		10, 35, 2, 28,24 10, 31	10, 18,	1, 29, 3, 39, 30, 36 18, 31	10, 13, 28, 38	14, 15, 3, 36 18, 40 37, 1	5, 29, 35, 0 3, 5	2, 14, 35, 2 30, 40 31, 4	8, 28, 27, 10 3, 18	27, 16, 18, 38	21, 36, 39, 31	1, 6, 13 35, 24	18, 28, 27 , 5 12, 31	18, 38	7, 35, 27, 8 2, 31	+	35, 10	24	39, 35 31, 28			10, 1, 34, 15, 34 29 33	, 32, 28, 2 2, 24 34	115.1	0 21	10, 35, 18, , 24 10, 13	18	10, 23	23 - Fe
24	Loss of Information	35	1, 26	26 30, 26	30, 16	2, 22	26, 32				10	10		19		-	9 19, 10		28, 32	24, 28,	23		22, 10, 1 1		27, 22			35, 33	35	13, 23, 15	24 - "Ir
25	Loss of Time	10, 20, 10, 20, 37, 35 26, 5						30,3	34, 11	35, 3, 29, 3 22, 5 28, 1	20, 10	10, 10	21,10	20, 17 13		10,6	0, 10, 5, 5 18, 32	10,39	24, 26, +	35, 38, 18, 16		24, 26, 28, 18		5, 22, 18, 35, 28 39 34, 4	10, 34	1, 10 35,		32, 10	35, 30		25 - Se
26	Quantity of substance/the matter	35, 6, 27, 26, 18, 31 18, 35	35, 18	29		29				15, 2, 14, 3 17, 40 34, 1		_							24, 28, 35, 38, 35 18, 16		20,40	8 33, 30	31		25, 10 10	), 25	, 29 27,	13, 3, 27, , 10 29, 18	8, 35	13, 29, 3, 27	26 - Co
27	Reliability	3, 8, 10, 3, 10, 8, 40 28	14, 4	15, 29, 17, 10 28, 11 14, 16	40.4	14. 24 2, 35, 2	11,28	8, 28, 10, 2 10, 3 35, 1	9 16, 11		23	0, 40		11, 32, 21, 13 27	13	21, 11		29, 39	10, 28 10, 30,		*****	11, 32, 1	. 21, 35, 2, 40	35, 2, 40, 26	40	, 11   13, 3	24 13, 3	35, 1 28	27	1, 35, 29, 38	27 - Ch
28	Measurement accuracy	32, 35, 28, 35, 26, 28 25, 26	3, 10	3, 10 32, 3	32, 3		32, 24			2 32, 35, 28, 6,	32 28, 6, 32	24	6, 19, 28, 24	6, 1, 32 3, 6	, 32	3, 6, 3	21	31, 28	20, 32		5, 11, 1,		26	3, 33, 39, 6, 35, 10 25, 18	17, 34 13	32, 3, 11	5 21 .	35, 26, 24, , 34 32, 28	10, 34		28 - Me
29	Manufacturing precision	28, 32, 28, 35, 13, 18 27, 9	29, 37			32, 23, 2 25, 10, 35		54,50	32, 30, 40	1				3, 32 32			2 13, 32, 2			32, 30	11, 32, 1	4	26, 28, 10, 4 36	I, 17, 34, 26	35, 23	5, 10		2, 18	26, 28, 1 18, 23	32, 39	29 - Pn
30	Object-affected harmful factors	22, 21, 2, 22, 27, 39 13, 24	39, 4		27, 2, 3 39, 35	22, 23, 34, 39, 37, 35 19, 27														35, 33, 29, 31	27, 24, 28, 33 2, 40 23, 26	26, 28, 10, 18	+	24, 35,	2 2, 25, 28, 39 35,	10, 2 35, 3	11, 22, 31 29,	19, 22, 19, ,40 29, 40		22, 35, 13, 24	30 - Flo
31	Object-generated harmful factors	19, 22, 35, 22, 15, 39 1, 39	16, 22		9 22, 1, 40					35, 40, 15, 3 27, 39 22,					10	2, 35,	18 21, 35, 2, 22			39 1	24, 2, 40, 39 3, 33, 2	6 4, 17, 34, 26		+			19, 1	1, 31 2, 21, 27, 1		22, 35, 18, 39	31 - Po
32	Ease of manufacture	28, 29, 1, 27, 15, 16 36, 13	13, 17		<u>-</u>	13, 29, 1, 40 35	35, 13, 8, 1	35, 12 35, 1 1, 3	9, 1,28, 7 13,27	11, 13, 1 1, 3, 3	27, 1, 4	35, 16	27, 26, 18	28, 24, 28, 27, 1 27	26,	27, 1 12, 2	19, 35	15, 34, 33	32, 24, 35, 28, 18, 16 34, 4	1,2.	1, 35, 12, 18		24, 2	+		1,9	, 15 27, 2	11, 1	1 8 78 11	35, 1, 10, 28	32 - Co
33	Ease of operation	25, 2, 6, 13, 1, 13, 15 25		1, 17, 13, 16	18, 16, 5 15, 39	1, 16, 4, 18, 35, 15 39, 31	18, 13, 34	28, 13 35 2, 32,	12 15, 34, 29, 28	32, 35, 32, 4 30 3, 2	0, 29, 3, 8, 8 25					35, 3 <sup>2</sup> 2, 10	2, 19, 13	28, 32, 2, 24	4, 10, 4, 28, 27, 22 10, 34	12, 35	17, 27, 25, 13 8, 40 2, 34	35, 23	2, 25, 28, 39	2, 5, 1		, 26, 15, 3 , 32 1, 1	34, 32, 16 12,		1, 34, 12, 3	15, 1, 28	33 - Ho
34	Ease of repair	2, 27 2, 27, 35, 11 35, 11	10, 25		10, 23	35, 11		, 11, 10 13	4	9	2, 11, 29, 28, 27	1		15, 1, 13 15 28			0, 15, 1, 2 32, 19	34, 27	32, 1, 10, 25	2, 28, 10, 25	11, 10, 1, 16 10, 2, 1			1, 35, 11, 10	26, 15	7, 1, 16	5 13,	, 11	34, 35, 7, 13	1, 32, 10	34 - Di:
35	Adaptability or versatility		29, 2	1, 35, 16 35, 30 29, 7		15, 35, 29	17	20	1,0		0		35	6, 22, 19, 26, 1 29	13		29 18, 15, 1	2, 13	35, 28	3, 35, 15	8, 24 10		35, 11, 32, 31	1, 13, 3	1, 16	4 885	37,	, 28		6, 37	35 - Pa
36	Device complexity	26, 30, 2, 26, 34, 36 35, 39	26, 24		5 6,36	34, 26, 6 1, 16				2, 22, 17, 19 2, 13,				24, 17, 27 13 29	20	30, 34	9, 10, 35, 4 13, 2	28, 29	6, 29	13, 3, 27, 10	10, 34	32	22, 19, 29, 40	19, 1 27, 26 1, 13	26, 24	, 13 29, 1	37	15, 10, 37, 28	15, 1, 24	12, 17, 28	36 - Pł
37	Difficulty of detecting and measuring	27, 26, 6, 13, 28, 13 28, 1	26, 24			29, 1, 4, 2, 18, 16 26, 31	3, 4, 16,	30, 28, 35, 3 40, 19 37, 3			3, 19, 29, 28 39, 25	25, 34, 6, 35	3, 27, 35, 16	2, 24, 26 35,	38 19, 35	18, 1		10, 24	35, 33, 18, 28, 27, 22 32, 9	29, 18	28, 8 32, 28		22, 19, 29,	2, 21 5, 28, 11, 29	2,5	2, 26 1, 1	37,	, 28   0000000	34, 21		37 - Th
38	Extent of automation	28, 26, 28, 26, 18, 35 35, 10	17, 28	23 13		35, 13, 16		2, 35 13, 3	1, 13	10, 1 25, 1				8, 32, 19 2, 3			21 23, 28	35, 10, 18, 5	35, 33 35, 30		11, 27, 28, 26, 32 10, 34	18, 23	2, 33	2 1, 26, 1	34, 3	35	) 1	_	888	5, 12, 35, 26	38 - St
39	Productivity			30, 7, 10, 26 14, 26 34, 31		2, 6, 34, 35, 37, 10 10, 2				35, 3, 29, 2 22, 39 10, 1							0, 28, 10, 29, 35			35, 38	1, 35, 1, 10, 10, 38 34, 28		22, 35, 13, 3. 24	5, 22, 18, 35, 28 39 2, 24				17, 35, 18, , 24 27, 2		+	39 - Ine
																															1



The 40 principles
- Segmentation
2 - Taking out
3 - Local quality
- Asymmetry
i - Merging
5 - Universality
r - "Nested Doll"
3 - Anti-weight
- Preliminary anti-action
) - Preliminary action
- Beforehand cushioning
? - Equipotentiality
B - "The other way round"
- Spheroidality - Curvature
5 - Dynamics
5 - Partial or excessive actions
7 - Another dimension
3 - Mechanical vibration
9 - Periodic action
) - Continuity of useful action
L - Skipping
2 - "Blessing in disguise" or "Turn Lemons into Lemonade"
3 - Feedback
I - "Intermediary"
i - Self-service
6 - Copying
7 - Cheap shirt-living objects
3 - Mechanics substitution
9 - Pneumatics and hydraulics
) - Flexible shells and thin films
l - Porous materials
2 - Color changes
3 - Homogenity
I - Discarding and recovering
5 - Parameter changes
5 - Phase transitions
7 - Thermal expansion
3 - Strong oxidants
) - Inert atmosphere
<u> </u>
) - Composite materials