APPENDIX 2 — Contradiction Matrix

Undesired	1	2	3	4	5	6	7	8	9	10 11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Result (Conflict)	ţ	bject	sct	bject	ing	bject	t	bject				bject		, t	: bject	LD.		nt by ject	t by bject		ergy			a			t	bu	ors ject	<i>a</i> ,	ability	e of				of		
Feature	ht of ng obj∈	ht of nary ol	th of ng obj∈	th of mary ol	of mov t	of nary ol	ne of ng obje	ne of nary ol	σ	ů v		lity of c	gth	oility of ng object	Durability of stationary ob	eraturo	tness	op	Energy spent by stationary object	r	e of ene	e of ance	Loss of information	e of tim	unt of ance	bility	uremei acy	Manufacturing accuracy	mful fact ng on ob	ful side :s	ıfactura	enience	irability	tability	e Iexity	olexity ol	of nation	uctivity
to Improve	Weight (moving	Weight	Length moving	Length station	Area of object	Area of station	Volume moving	Volume stationa	Spee	Force Tensi	Shap	Stabi	Strength	Durabilit moving	Dural statio	Temp	Brightness	Energy s moving	Energ statio	Powe	Waste	Waste substa	Loss e inforr	Waste	Amount substanc	Reliability	Meas accur	Manu accur	Harm acting	Harmful effects	Manu	Conv use	Repair	Adap	Devic comp	Comple control	Level of automat	Produ
1 Weight of moving object			15, 8, 29, 34		29, 17, 38, 34		29, 2, 40, 28		15, 38 1	8, 10, 10, 3 8, 37 37, 4	0 35, 40	19, 39	18, 40			4, 38	32	35, 12, 34, 31			34, 19	3, 31		20, 28	18, 31				18, 27		1, 36						26, 35, 3 18, 19 2	
2 Weight of stationary object				10, 1, 29, 35		35, 30, 13, 2		5, 35, 14, 2	1	3, 10, 13, 2 9, 35 10, 1	8 29, 14	1, 40	10, 27			28, 19, 32, 22	19, 32, 35				18, 19, 28, 15			35, 26	18, 26	8, 3		35, 17	22, 37	35, 22, 1, 39	9	1, 32	28, 11	29	26, 39	17, 15	2, 26, 1 35 1	15, 35
3 Length of moving object	8, 15, 29, 34				15, 17, 4		7, 17, 4, 35		13, 4, 1 8	4 35	10, 29	15, 34		19		10, 15, 19	32	8, 35, 24		1, 35	7, 2, 35, 39		1, 24	29	29, 33	29, 40		29, 37	1, 15, 17, 24	17, 15		15, 29, 35, 4		14, 15, 1, 16			7, 24, 1 26, 16 2	28, 29
4 Length of stationary object		35, 28, 40, 29				17, 7, 10, 40		35, 8, 2, 14		35	-	35	28, 26		35	3, 35, 38, 18	3, 25					24, 33	24, 26	30, 29, 14		28	32, 28, 3	10	1, 18		15, 17, 27	2, 25	3		1, 26	26	-	30, 14, 7, 26
5 Area of moving object	2, 17 29, 4		14, 15, 18, 4				7, 14, 17, 4		4, 34	9, 30, 10, 1 35, 2 36, 2	8 29, 4	11, 2, 13, 39	3, 15, 40, 14	6, 3		10	15, 32, 19, 13	19, 32		19, 10, 32, 18	15, 17, 30, 26	2, 39	30, 26	20,4	6, 13		26, 28, 32, 3			17, 2, 18, 39	13, 1, 26, 24	15, 17, 13, 16	15, 13, 10, 1	15, 30	13	26, 18	4, 30, 1 28, 23	34, 2
6 Area of stationary object		30, 2, 14, 18		26, 7, 9, 39					3	, 18, 10, 1 5, 36 36, 3	7	2, 38	40		19, 30					17, 32		18, 39	50, 10	4, 18	40, 4	40, 4	26, 28, 32, 3	18, 36	39, 35	40	40, 16		16	15, 16	36	2, 35, 30, 18	23	0, 15, 17, 7
7 Volume of moving object	2, 26, 29, 40	_	1, 7, 4, 35		1, 7, 4, 17				38, 34 3	5, 35, 6, 35 6, 37 36, 3	7 29, 4	1, 39	15, 7	4		34, 39, 10, 18	2, 13, 10	35			7, 15, 13, 16	34, 10	2, 22	34, 10	29, 30, 7	40, 11		2, 16	27, 35		29, 1, 40		10	15, 29	20, 1	4	35, 34, 1 16, 24	2, 34
8 Volume of stationary object		19, 14	19, 14	2, 14						2, 18, 37 24, 3	35	34, 28, 35, 40	17, 15		35, 34, 38	4				30, 6		10, 39, 35, 34		32, 18	35, 3	2, 35, 16			19, 27	35, 4	35		1		1, 31	2, 17, 26		35, 37, 10, 2
9 Speed	2, 28, 13, 38		13, 14, 8		29, 30, 34	4.40	7, 29, 34		1	3, 28, 6, 18 5, 19 38, 4	0 18, 34	-	26, 14	3, 19, 35, 5		28, 30, 36, 2		35, 38		38, 2	14, 20, 19, 35	28, 38	13, 26		29, 38	27, 28	28, 32, 1, 24	32, 25	35, 23	35, 21		13, 12	28, 27	26	10, 28, 4, 34	27, 16	0, 18	
10 Force	37, 18	-	6, 36	28, 10		36, 37	12, 37	2, 36, 18, 37		18, 2 11	40, 34		14, 27	19, 2		35, 10, 24		10	1, 16, 36, 37	18, 37	14, 15	8, 35, 40, 5		36	18, 36	13, 21		37, 36	40, 18	13, 3, 36, 24	18, 1				26, 35, 10, 18	10, 19	2, 35	3, 28, 35, 37
11 Tension, pressure	37, 40	13, 29, 10, 18	36	14, 16		10, 15, 35, 37	10	35, 24	6, 35, 3 36	21	15, 10	2, 40	9, 18, 3, 40	19, 3, 27		35, 39, 19, 2		14, 24, 10, 37		10, 35, 14	25	10, 36, 3, 37		4	10, 14, 36	19, 35	25	3, 33		27, 18	1, 35, 16	11	2	35	35	37	3, 24	0, 14, 35, 37
12 Shape	29, 40	15, 10, 26, 3	5, 4	10, 7	4, 10		14, 4, 15, 22	35	34, 18 3	5, 10, 34, 1 7, 40 10, 1	4		30, 14, 10, 40	9, 25		22, 14, 19, 32	32	2, 6, 34, 14		4, 6, 2	14	35, 29, 3, 5		34, 17	30, 22	16	28, 32, 1 1	40	2, 35	3 5 , I	17, 28		1	29	1, 28		32 3	7, 26, 34, 10
13 Stability of object	2, 39		1, 28	57	2, 11, 13	39	19, 39	35, 40	28, 18 2	0, 35, 2, 35 1, 16 40	18, 4	12.17	15		35, 23		27, 15	15, 19		27, 31	39, 6				15, 32, 35		13		50, 10			50	10, 16	34, 2	22, 26	39, 23	35 4	23, 35, 40, 3
14 Strength	40, 15	27, 1	8, 35	28, 26	40, 29		14, 7	17, 15	26, 14	0, 18, 10, 3 3, 14 18, 4	0 35, 40	35		27, 3, 26		40		19, 35, 10	33	10, 26, 35, 28	35	35, 28, 31, 40	2	29, 3, 28, 10	27		16	5, 27	37, 1	15, 35, 22, 2	10, 32	28, 2	3	32	28	15, 40	15 1	29, 35, 10, 14
15 Durability of moving object	19, 5, 34, 31		2, 19, 9		3, 17, 19		10, 2, 19, 30		3, 35, 5	19, 2, 19, 3 16 27	, 14, 26, 28, 25	35	27, 3, 10				2, 19, 4, 35			19, 10, 35, 38		28, 27, 3, 18	10	28, 18		13	3	16, 40	33, 28	21, 39, 16, 22	27, 1, 4	12, 27	29, 10, 27	1, 35, 13	29, 15	39, 33		85, 17, 14, 19
16 Durability of stationary object	26.22	6, 27, 19, 16		1, 10, 35	2.25			35, 34, 38	2.20.2	F 40 25 2	14.22	39, 3, 35, 23				19, 18, 36, 40				16		27, 16, 18, 38	10	28, 20, 10, 16	31	34, 27, 6, 40	24		17, 1, 40, 33		35, 10		1	2		25, 34, 6, 35	1	0, 20, 16, 38
17 Temperature	6, 38	-	15, 19, 9	9	39, 18	35, 38	34, 39, 40, 18	35, 6, 4	2, 28, 3 36, 30	5, 10, 35, 3 3, 21 19, 2	9, 14, 22, 2 19, 32	1, 35, 32	10, 30, 22, 40	39	36, 40		32, 30, 21, 16	3, 17	22.25	17, 25	21, 17, 35, 38	29, 31		21, 18	3, 17, 30, 39	3, 10	24	24		22, 35, 2, 24			16	27	16	35, 31		35
18 Brightness	32	2, 35, 32			19, 32, 26		35, 13,		0 15 1	6, 26, 23, 1	1 12 2	10.12	5 10	2, 19, 6		32, 35, 19	2.15	32, 1, 19	1, 15		19, 16, 1, 6			26, 17	1, 19		11, 15, 32	3, 32		32, 39	28, 26	19	13, 16	1, 19	13		2, 26, 2 10	2, 25, 16
19 Energy spent by moving object	12, 18, 28, 31		12, 28		15, 19, 25		18			21, 2 25		19, 13, 17, 24				19, 24, 3, 14	19				12, 22, 15, 24	18, 5		19, 18	34, 23, 16, 18	11, 27				2, 35, 6 19, 22,	28, 26, 30	19, 35	1, 15, 17, 28	13, 17, 13, 16			\$2, 2	2, 28, 35
20 Energy spent by stationary object	8, 36,	6, 27	1 10			17 22	35, 6,	30.6		6, 37 26, 2, 22, 1	29.14	27, 4, 29, 19	35	10 25		1	19, 2, 35, 32 16, 6,	16.6				28, 27, 18, 31			3, 35, 31	23	32, 15,		22, 37	18	1, 4	26.35	35.2	10 17		19, 35, 16, 25	28, 2, 2	1,6
21 Power		17, 27		6 39	19, 38 15, 26,	13, 38	38	25	2 3	6, 35 35	2, 40	15, 31 14, 2,	20, 10, 28	10, 38	16	17, 25		10, 0, 19, 37			30	10, 30		10,0	19	20, 31	2		31, 2	2, 33, 18 21, 35,	34	10	10, 34		30, 34		17	34
22 Waste of energy	19, 28	18, 9	6, 13	7	17, 30	30, 18	23		16, 35, 38	6, 38 4, 15, 3, 36	20.25	39, 6	26	28.27	27.16	7	32, 15		28.27	3, 38		2, 37	19, 10	32, /	25	35			35, 2	2, 22	15 34	1	2, 19	15 10	7, 23	15, 23	2 35, 10, 2	28, 10, 29, 35
23 substance	23, 40	22, 32 10, 35,	10, 39	24	10, 31	39, 31	30, 36	18, 31	28, 38 1	4, 13, 3, 30 8, 40 37, 1	, 29, 33, 0 3, 5	30, 40	33, 28, 31, 40	3, 18	18, 38	39, 31	1, 0, 13	24, 5	12, 31	18, 38	2, 31			35, 10		39, 35		24, 31		34, 29	33	2, 24	2, 33, 34, 27	2	28, 24	10, 13	18	10, 23 13, 23,
²⁴ information	10, 24, 35 10, 20,	5	1, 26 15, 2,		30, 26		2.5	2, 22 35, 16,		0, 37, 37, 3	5 4 10	35.3	29.3	10	10 28 20	35 29	19	35 38		,	10, 19	35 18		28, 32	35	23	24 34		1	22 35, 22,		27, 22	37 1			35, 33 18, 28, 2	35	15
25 Waste of time	37, 35	26, 5 27, 26,	29	14, 5		17, 4	34, 10	32, 18			34, 17	22, 5	28, 18	28, 18		21, 18	26, 17			10, 6	18, 32	10, 39			18, 16	10, 30, 4 18, 3,	28, 32	28, 18	34	18, 39 3, 35,	34, 4	10, 34	10	35, 28	6, 29	32, 10		13 20
²⁰ substance	18, 31	18, 35 3, 10,	35, 18		29	40, 4	29		54,20	3 14, 3 3, 28, 10, 2	·	17,40	34, 10	10, 40	31	39		16, 18 21, 11,	31	35		10, 24	35	18, 16		28, 40	28		29, 31	40, 39 35, 2,	35, 27	25, 10 27, 17,	10, 25	29	27, 10	29, 18	8, 35 11, 13,	3, 27
27 Reliability	10, 40		14, 4	28, 11	14, 16	40, 4	14, 24	24	11, 28	$\begin{array}{c cccc} 1, 20, & 10, 2\\ 10, 3 & 35, 1\\ 32, 2 & 6, 28\\ 32, 2 & 32 \end{array}$	9 16, 11			3,23	0,40	10	13	21,19	36, 23	20, 31	35 26, 32,	29, 39	10, 20		40, 3		11, 23	1		40, 26 3, 33,		40	1, 11	8, 24	1 27, 35,	28		29, 38
28 accuracy accuracy Manufacturing	26, 28,	25, 26	5, 16	3, 16	32, 3	32, 3	6		32, 24	52	52	15	52	52	24	20, 24	52	52		32	27	31, 28		28, 32	32	1, 23				39, 10	25, 18	17, 34	13, 11	2		32, 28	10, 34 26, 28, 1	28, 32
29 accuracy accuracy Harmful factors	15, 10	27, 9 2, 22,	29, 37	10	29, 32	10, 50	2	33	52 3	8, 19, 4, 36 3, 35, 22, 2	40			40			3, 32 1, 19,		10, 2,	32, 2 19, 22,	2	10, 24		20, 10						34, 26		1, 32, 35, 23 2, 25,			18		18, 23 33, 3, 2	32, 39
acting on object	27, 39	13, 24 35, 22,	39, 4	1, 18	33, 28	39, 35	37, 35	19, 27	35, 28	9, 18 37 5, 28, 2, 33	3, 35	30, 18	37, 1	33, 28	40, 33	35, 2	32, 13	6, 27	22, 37	31, 2	35, 2	19, 40	2	34	29, 31	2, 40	23, 26	10, 18				28, 39				29, 40	34	13, 24 22, 35,
31		4 20	16 22	15, 17,	10.00	40	40	25.4	3, 23	1, 40 27, 1 5, 12 35, 1 1, 35, 1	8	27, 39	22, 2	33, 31	16, 22	2, 24	39, 32	6	18	18	2, 22	34	29 32, 24,		39, 1	40, 39	26 1, 35,	34, 26				2, 5,	35.1.	2, 13,	31	27, 1 6, 28,	Z .	18, 39 35, 1,
32 Manufacturability 33 Convenience of		36, 13 6, 13,		27	26, 12 1. 17.	16, 40 18, 16,	1, 40	35 4, 18,	0, 1	5, 12 1, 3 8, 13, 2, 32	13, 27	1	10, 52	-		10	27,1	27,1									12 18		24, 2 2, 25,		2, 5,	13, 16	11, 9		1	11, 1		10, 28
use	13, 15	1, 25	13, 12		13, 16	15, 39	35, 15	39, 31	34	35 12	29,28	30	3, 28	29, 3, <u>8, 25</u> 11, 29,	25	13	1, 24			2, 10 15, 10	2, 19, 13 15, 1,	2, 24	4, 10, 27, 22	+, ∠8, 10, 34 32. 1	12, 35 2, 28	8, 40 11. 10	2, 34	35, 23	28, 39 35, 10		12	1, 12,	1, 32	1, 16	12, 17 35, 1,			28
34 Repairability		2, 27, 35, 11 19, 15,						1	34, 9	10	2, 4	2, 35	2, 9	28, 27	I	4, 10 27, 2,	13	28, 16 19, 35,		32, 2	32, 19 18, 15,	34, 27		10, 25	10, 25	1, 16	10, 2, 13 35, 5, 1, 10	23, 10	2, 16 35, 11,		11, 10	26, 15 15, 34,	1, 16		13, 11 15, 29,		7, 13 27, 34, 3	10
35 Adaptability		19, 15, 29, 16 2, 36,		16	29, 7 14, 1,	15, 16	29 34.25			5, 17, 20 35, 1	1,0	17	52,0	55		3, 35	26, 1	29, 13 27, 2,		29	10, 13,	2, 13			15	0, 24	1, 10		32, 31		31	1, 16	7, 4	29, 15, 28, 37	37, 28	1		6, 37
36 Device complexity 37 Complexity of	34, 36	2, 30, 35, 39 6, 13,	26, 24		13, 16 2, 13,	6, 36 2. 39	6 29.1	1, 16 2, 18,	28	6, 16 19, 1 35 6, 28, 35, 3 0, 10, 27, 2	28, 15 5, 27, 13	17, 19	28	10, 4, 28, 15 19, 29,	25.24	13	13	29, 28	19, 35,	30, 34	13, 2	28, 29	35, 33,				2, 26, 10, 34 26, 24,	32	29, 40 22, 19	19, 1 2, 21	1, 13	20,21		20, 37	15, 10,	37, 28	24	28
37 control	28, 13	28, 1 28, 26,	26, 24		2, 13, 15, 17 17, 14,	30, 10	4, 16 35, 13,	20, 31	10, 35 4	0, 19 37, 3	2 1, 39	39, 30	15, 28	39, 25	6, 35	35, 10	20	35, 38 2, 32,	19, 33, 16	16, 10	15, 19	10, 24	27, 22	32, 9	29, 18	28, 8	32, 28					2, 5 1, 12,	12, 26 1, 35,		37, 28		34, 21 3	35, 18 5, 12,
automation	18, 35	28, 28, 35, 10 28, 27,	17, 28	25	13		16			2, 35 13, 35 8, 15, 10, 3	1, 15				20 10	19	19	13			23, 28 28, 10,	-	35, 33 13, 15,			1 25				2 32, 22,	13	34, 3	13	1, 35	10	25	:	3, 12, 35, 26
39 Productivity		28, 27, 15, 3								8, 15, 10, 3 0, 36 14											28, 10, 29, 35				35, 38	10, 38	34, 28	32, 1	13, 24	32, 22, 18, 39	2, 24	7, 19	10, 25	28, 37	28, 24	27, 2	3, 12, 35, 26	