

Supplementary materials for

Zhi-qiang Feng, Cun-gen Liu, Hu Huang, 2014. Knowledge modeling based on interval-valued fuzzy rough set and similarity inference: prediction of welding distortion. *J. Zhejiang Univ.-Sci. C (Comput. & Electron.)*, **15**(8):636-650. <http://dx.dor.org/10.1631/jzus.C1300370>

Table S1 Full data of the welding distortion decision table*

U	Leg size (mm)	Current (A)	Thickness (mm)	Distortion (mm)
u_1	5.5	175	10	0.13
u_2	5.0	150	12	0.09
u_3	4.0	115	10	0.10
u_4	4.5	180	10	0.11
u_5	6.0	125	6	0.55
u_6	3.0	145	8	0.08
u_7	5.5	125	6	0.48
u_8	5.0	120	6	0.44
u_9	4.0	130	5	0.39
u_{10}	5.5	155	7	0.38
u_{11}	4.5	150	4	0.59
u_{12}	5.5	180	11	0.09
u_{13}	6.0	100	5	0.57
u_{14}	6.5	195	9	0.36
u_{15}	4.5	140	8	0.25
u_{16}	3.0	185	10	0.11
u_{17}	3.5	155	6	0.29
u_{18}	4.0	95	6	0.33
u_{19}	6.0	145	11	0.13
u_{20}	5.5	120	4	0.63
u_{21}	3.0	160	12	0.06
u_{22}	4.0	205	9	0.18
u_{23}	3.5	180	5	0.35
u_{24}	4.0	200	11	0.10
u_{25}	6.0	155	10	0.15
u_{26}	6.5	150	4	0.66
u_{27}	4.0	150	6	0.32
u_{28}	6.0	195	6	0.55
u_{29}	3.5	95	7	0.18
u_{30}	5.5	165	6	0.53

* Corresponding to Table 3 in the text

Table S2 Interval-valued fuzzy decision table of welding deformation *

U	a_1			a_2			a_3			d		
	A_{11}	A_{12}	A_{13}	A_{21}	A_{22}	A_{23}	A_{31}	A_{32}	A_{33}	D_1	D_2	D_3
u_1	[0.6,0.8]	[0.2,0.3]	[0,0]	[0.6,0.7]	[0.3,0.3]	[0,0]	[0.7,0.8]	[0.1,0.2]	[0,0]	[0,0]	[0.1,0.2]	[0.8,0.8]
u_2	[0.2,0.3]	[1,1]	[0.1,0.2]	[0.2,0.2]	[1,1]	[0.2,0.3]	[1,1]	[0,0]	[0,0]	[0,0]	[0,0]	[1,1]
u_3	[0,0]	[0.3,0.4]	[0.6,0.7]	[0,0]	[0.1,0.3]	[0.8,0.8]	[0.7,0.8]	[0.1,0.2]	[0,0]	[0,0]	[0,0]	[1,1]
u_4	[0.2,0.3]	[1,1]	[0.1,0.2]	[0.6,0.7]	[0.3,0.3]	[0,0]	[0.7,0.8]	[0.1,0.2]	[0,0]	[0,0]	[0,0]	[1,1]
u_5	[1,1]	[0,0]	[0,0]	[0,0]	[0.1,0.3]	[0.8,0.8]	[0,0]	[0.2,0.3]	[0.7,0.7]	[1,1]	[0,0]	[0,0]
u_6	[0,0]	[0,0]	[1,1]	[0.2,0.2]	[1,1]	[0.2,0.3]	[0.1,0.2]	[1,1]	[0.2,0.2]	[0,0]	[0,0]	[1,1]
u_7	[0.6,0.8]	[0.2,0.3]	[0,0]	[0,0]	[0.1,0.3]	[0.8,0.8]	[0,0]	[0.2,0.3]	[0.7,0.7]	[0.7,0.8]	[0.2,0.2]	[0,0]
u_8	[0.2,0.3]	[1,1]	[0.1,0.2]	[0,0]	[0.1,0.3]	[0.8,0.8]	[0,0]	[0.2,0.3]	[0.7,0.7]	[0.7,0.8]	[0.2,0.2]	[0,0]
u_9	[0,0]	[0.3,0.4]	[0.6,0.7]	[0,0]	[0.1,0.3]	[0.8,0.8]	[0,0]	[0,0]	[1,1]	[0.1,0.3]	[1,1]	[0.3,0.3]
u_{10}	[0.6,0.8]	[0.2,0.3]	[0,0]	[0.2,0.2]	[1,1]	[0.2,0.3]	[0.1,0.2]	[1,1]	[0.2,0.2]	[0.1,0.3]	[1,1]	[0.3,0.3]
u_{11}	[0.2,0.3]	[1,1]	[0.1,0.2]	[0.2,0.2]	[1,1]	[0.2,0.3]	[0,0]	[0,0]	[1,1]	[1,1]	[0,0]	[0,0]
u_{12}	[0.6,0.8]	[0.2,0.3]	[0,0]	[0.6,0.7]	[0.3,0.3]	[0,0]	[1,1]	[0,0]	[0,0]	[0,0]	[0,0]	[1,1]
u_{13}	[1,1]	[0,0]	[0,0]	[0,0]	[0,0]	[1,1]	[0,0]	[0,0]	[1,1]	[1,1]	[0,0]	[0,0]
u_{14}	[1,1]	[0,0]	[0,0]	[1,1]	[0,0]	[0,0]	[0.1,0.2]	[1,1]	[0.2,0.2]	[0.1,0.3]	[1,1]	[0.3,0.3]
u_{15}	[0.2,0.3]	[1,1]	[0.1,0.2]	[0.2,0.2]	[1,1]	[0.2,0.3]	[0.1,0.2]	[1,1]	[0.2,0.2]	[0,0]	[0.1,0.2]	[0.8,0.8]
u_{16}	[0,0]	[0,0]	[1,1]	[0.6,0.7]	[0.3,0.3]	[0,0]	[0.7,0.8]	[0.1,0.2]	[0,0]	[0,0]	[0,0]	[1,1]
u_{17}	[0,0]	[0,0]	[1,1]	[0.2,0.2]	[1,1]	[0.2,0.3]	[0,0]	[0.2,0.3]	[0.7,0.7]	[0.1,0.3]	[1,1]	[0.3,0.3]
u_{18}	[0,0]	[0.3,0.4]	[0.6,0.7]	[0,0]	[0,0]	[1,1]	[0,0]	[0.2,0.3]	[0.7,0.7]	[0.1,0.3]	[1,1]	[0.3,0.3]
u_{19}	[1,1]	[0,0]	[0,0]	[0.2,0.2]	[1,1]	[0.2,0.3]	[1,1]	[0,0]	[0,0]	[0,0]	[0.1,0.2]	[0.8,0.8]
u_{20}	[0.6,0.8]	[0.2,0.3]	[0,0]	[0,0]	[0.1,0.3]	[0.8,0.8]	[0,0]	[0,0]	[1,1]	[1,1]	[0,0]	[0,0]
u_{21}	[0,0]	[0,0]	[1,1]	[0.2,0.2]	[1,1]	[0.2,0.3]	[1,1]	[0,0]	[0,0]	[0,0]	[0,0]	[1,1]
u_{22}	[0,0]	[0.3,0.4]	[0.6,0.7]	[1,1]	[0,0]	[0,0]	[0.1,0.2]	[1,1]	[0.2,0.2]	[0,0]	[0.1,0.2]	[0.8,0.8]
u_{23}	[0,0]	[0,0]	[1,1]	[0.6,0.7]	[0.3,0.3]	[0,0]	[0,0]	[0,0]	[1,1]	[0.1,0.3]	[1,1]	[0.3,0.3]
u_{24}	[0,0]	[0.3,0.4]	[0.6,0.7]	[1,1]	[0,0]	[0,0]	[1,1]	[0,0]	[0,0]	[0,0]	[0,0]	[1,1]
u_{25}	[1,1]	[0,0]	[0,0]	[0.2,0.2]	[1,1]	[0.2,0.3]	[0.7,0.8]	[0.1,0.2]	[0,0]	[0,0]	[0.1,0.2]	[0.8,0.8]
u_{26}	[1,1]	[0,0]	[0,0]	[0.2,0.2]	[1,1]	[0.2,0.3]	[0,0]	[0,0]	[1,1]	[1,1]	[0,0]	[0,0]
u_{27}	[0,0]	[0.3,0.4]	[0.6,0.7]	[0.2,0.2]	[1,1]	[0.2,0.3]	[0,0]	[0.2,0.3]	[0.7,0.7]	[0.1,0.3]	[1,1]	[0.3,0.3]
u_{28}	[1,1]	[0,0]	[0,0]	[1,1]	[0,0]	[0,0]	[0,0]	[0.2,0.3]	[0.7,0.7]	[1,1]	[0,0]	[0,0]
u_{29}	[0,0]	[0,0]	[1,1]	[0,0]	[0,0]	[1,1]	[0.1,0.2]	[1,1]	[0.2,0.2]	[0,0]	[0.1,0.2]	[0.8,0.8]
u_{30}	[0.6,0.8]	[0.2,0.3]	[0,0]	[0.6,0.7]	[0.3,0.3]	[0,0]	[0,0]	[0.2,0.3]	[0.7,0.7]	[0.7,0.8]	[0.2,0.2]	[0,0]

* Corresponding to Table 4 in the text

Table S3 Data of test samples*

Test sample	Leg size (mm)	Current (A)	Thickness (mm)	Distortion (mm)
t_1	5.5	190	6	0.53
t_2	4.5	150	8	0.26
t_3	3.0	100	5	0.33
t_4	6.5	190	12	0.16
t_5	6.0	175	10	0.14
t_6	5.5	110	6	0.52
t_7	3.5	160	11	0.11
t_8	4.0	95	7	0.22
t_9	4.5	105	8	0.25
t_{10}	4.5	140	5	0.46

* Corresponding to Table 5 in the text