Kris

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Kris:
KRIS [2] is a complete description logic knowledge representation system, including both a Tbox and an Abox. The logic implemented in KRIS is $\mathcal{ALCNF}$, that is $\mathcal{ALC}$ with number restrictions, features and feature-chain agreement; an extension to include reasoning with concrete domains is also available. KRIS uses a sound and complete tableaux algorithm, with a number of optimisations to improve performance [1]. Programming language: Common Lisp (compiled).

Availability:
Further information about KRIS can be obtained from H.-J. Burckert:

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Advantages:
KRIS performs sound and complete reasoning with respect to a relatively expressive concept description language. It is a well established system and should therefore be relatively stable.

Hardware and Software:
PC clone; 200MHz Pentium II CPU; 64MB RAM; Linux; Allegro CL 4.3.

Results:
Note that although KRIS's reasoning is sound and complete, the classifier behaves strangely when the KB contains synonyms (multiple concepts with equivalent definitions). This results in several errors in the KB classification tests.

References

[1] F. Baader, E. Franconi, B. Hollunder, B. Nebel, and H.-J. Profitlich. An empirical analysis of optimization techniques for terminological representation systems or: Making KRIS get a move on. In B. Nebel, C. Rich, and W. Swartout, editors, *Principles of Knowledge Representation and Reasoning: Proceedings of the Third International Conference (KR'92)*, pages 270–281. Morgan-Kaufmann Publishers, San Francisco, CA, 1992. Also available as DFKI RR-93-03.

[2] F. Baader and B. Hollunder. A terminological knowledge representation system with complete inference algorithms. In *Processing declarative knowledge: International workshop PDK'91*, number 567 in Lecture Notes in Artificial Intelligence, pages 67–86, Berlin, 1991. Springer-Verlag.

Table 1: Tableaux'98 Concept Satisfiability Tests

	Incoherent		**Coherent**	
Test	**Size**	**Correct**	**Size**	**Correct**
k_branch	3	Y	3	Y
k_d4	8	Y	7	Y
k_dum	15	Y	21	Y
k_grz	13	Y	21	Y
k_lin	6	Y	9	Y
k_path	4	Y	12	Y
k_ph	4	Y	5	Y
k_poly	11	Y	21	Y
k_t4p	7	Y	6	Y

Table 3: Realistic Tbox Classification Tests

Test	**Concepts**	**Time (s)**	**Correct**
ckb-roles	79	0.68	Y
datamont-roles	120	0.89	Y
espr-roles	142	0.58	Y
fss-roles	132	1.16	N
wines	267	2.99	Y
wisber-roles	140	1.03	Y
galen1	2,728	>1000.00	?
galen2	3,926	454.68	Y

Table 2: Tableaux'98 KB Tests

	Incoherent			Coherent		
Test	**Size**	**Concepts**	**Correct**	**Size**	**Concepts**	**Correct**
k_branch	2	173	Y	2	170	Y
k_d4	6	291	Y	3	168	Y
k_dum	5	121	Y	7	188	Y
k_grz	4	166	Y	8	317	Y
k_lin	2	99	Y	10	1,059	Y
k_path	2	94	Y	1	91	Y
k_ph	2	28	Y	3	73	Y
k_poly	4	260	Y	4	234	Y
k_t4p	2	105	Y	2	128	Y

Table 4: Synthetic Tbox Classification Tests

Test	Concepts	Time (s)	Correct
hc14	10	0.16	Y
hc18	18	0.46	Y
hc112	26	1.18	Y
hc24	46	0.91	Y
hc28	94	6.03	Y
hc212	142	20.44	Y
hc34	18	0.55	Y
hc36	26	1.26	Y
hc38	34	2.61	Y
hc44	7	0.16	Y
hc48	7	1.22	Y
hc412	7	15.63	Y

Table 5: Tableaux'98 Abox Realisation Tests

Test	Conc's	Ind's	Time (s)	Correct
k_branch_n	71	27	0.23	Y
k_d4_n	48	24	16.27	Y
k_dum_n	71	14	0.25	Y
k_grz_n	109	19	0.13	Y
k_lin_n	10	10	0.05	Y
k_path_n	91	174	150.76	Y
k_ph_n	7	8	0.04	Y
k_poly_n	66	128	>1,000.00	?
k_t4p_n	72	97	>1,000.00	?

Table 6: Random Tbox Classification Tests

Test	Concepts	Time (s)	Correct
kris151	16	0.08	Y
kris301	31	0.13	Y
kris451	46	0.32	Y
kris601	61	0.41	Y
kris751	76	0.37	Y
kris901	91	0.68	Y
kris1051	106	0.61	Y
kris1201	121	0.78	Y
kris1351	136	1.07	Y
kris1501	151	1.18	Y
kris2001	201	1.47	Y
kris4001	401	5.25	N
kris6001	601	11.66	N
kris8001	801	14.01	N
kris10001	1,001	31.29	N
kris12001	1,201	50.90	N
kris14001	1,401	33.91	N
kris16001	1,601	65.55	N
kris18001	1,801	73.64	N
kris20001	2,001	114.17	N
kris25001	2,501	248.70	N
kris30001	3,001	229.58	N
kris35001	3,501	565.22	N
kris40001	4,001	1012.00	N
kris45001	4,501	>1000.00	?
kris50001	5,001	>1000.00	?