

Predicate frequencies

October 5, 2004

1 Some statistics

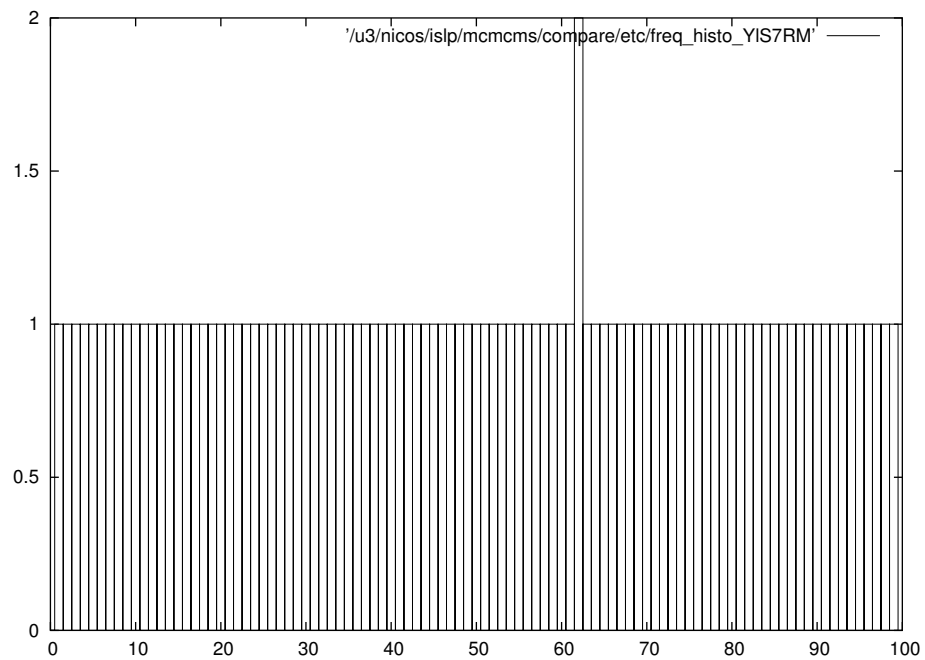


Fig. 1. Automatically generated statistics for
Frequencies of 100 samples drawn independently from program
../bns/slps/bn_or_any_6h34.slp using goal bn([1,2,3,4,5,6,7,8],_99) and observing _99

2 The Full Frequencies

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'[1-[], 2-[1], 3-[2], 4-[2,3], 5-[1,4], 6-[3,4]]-1 '

3 SLP Program

```

:- use_module( library(lists) ).
:- use_module( library(ugraphs) ).
:- use_module( library(ordsets) ).

bn( X, Y ) :-
    bn( X, [], Y ).
bn( [], _All, [] ).
bn( [RV|RVs], CandParents, BN ) :-          %it's a Bayes net if
    bn(RVs, [RV|CandParents], TailBN),      %this is and ..
    choose_parents_pre(RV, CandParents, Parents),
    list_to_ord_set(Parents, OrdParents),
    ord_add_element(TailBN, RV-OrdParents, BN).

choose_parents_pre(6, _CandParents, [3,4] ).
choose_parents_pre(RV, CandParents, Parents ) :-
    RV =\= 6,
    choose_parents( CandParents, Parents ).

3/4 :: choose_parents([A|CandParents], ParentL) :-
    pselect([A|CandParents], AL, RestCPs),
    choose_parents( RestCPs, RestL ),
    ord_union( [AL], RestL, ParentL ).

1/4 :: choose_parents(CandParents, []).

:- pvars( pselect(L, _E, _R), [T-length(L,T)] ).
1/X :: [X] :: pselect( [H|T], H, T ).
(1 - 1/X) :: [X] :: pselect( [H|T], El, [H|R] ) :-
    [(X - 1)] :: pselect( T, El, R ).

```

4 Transformed Program

```

:- module( slp, [] ).
:- compile(library('../runtime_rm')).

bn(1, [1|A]/B, [1|C]/D, E, F) :-
    bn(_, A/B, C/D, E, [], F).

bn(2, [2|A]/A, [2|B]/B, [], _, []).

bn(3, [3|A]/B, [3|C]/D, [E|F], G, H) :-

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bn(_, A/I, C/J, F, [E|G], K),
choose_parents_pre(_, I/L, J/M, E, G, N),
ordsets:list_to_ord_set(N, 0),
L=P,
M=Q,
ordsets:ord_add_element(K, E-0, H),
P=B,
Q=D.

choose_parents([A|B]/C, [D|E]/F, G, H) :-
    select_id([[[_|_],_],[_,[ ]]], [G,H], [0.75,0.25], 4, A, B, D, I, J),
    sidx_choose_parents(I, [G,H], J, C, E, F).

sidx_choose_parents(4, [[A|B],C], D, E, F, G) :-
    pselect(D/H, F/I, _, [A|B], J, K),
    choose_parents(H/L, I/M, K, N),
    ordsets:ord_union([J], N, C),
    L=E,
    M=G.
sidx_choose_parents(5, [_,[ ]], A, A, B, B).

choose_parents_pre(6, [6|A]/A, [6|B]/B, 6, _, [3,4]).

choose_parents_pre(7, [7|A]/B, [7|C]/D, E, F, G) :-
    user:(E=\=6),
    A=H,
    C=I,
    choose_parents(H/B, I/D, F, G).

pselect([A|B]/C, [D|E]/F, G, H, I, J) :-
    select_id_expr([[K|L],K,L],[M|_],_,[M|_]], [H,I,J], pselect/3,
    [1/N-[N],1-1/O-[O]], G, 8, A, B, D, P, Q),
    sidx_pselect(P, [H,I,J], [N,0], Q, C, E, F).

sidx_pselect(8, [[A|B],A,B], [_,_], C, C, D, D).
sidx_pselect(9, [[A|B],C,[A|D]], [_,E], F, G, H, I) :-
    pselect(F/G, H/I, [E-1], B, C, D).

```