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%
% Written by:
% --
% John L. Weatherwax          2007-12-07
%
% email: wax@alum.mit.edu
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% Please send comments and especially bug reports to the
% above email address.
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% the number of experiments:
N_EXPS = 1000;

% the number of learning episodes (for complete learning this would need to be much
larger):
nEpisodes = 10;

% the number of random walk states (not including the two terminal states):
%n_rw_states = 17;
n_rw_states = 19;
%n_rw_states = 7;

% the true solution:
% (when zero is the reward for going off the left end):
%Vtruth = (0:(n_rw_states+1))/(n_rw_states+1); Vtruth(1)=[]; Vtruth(end)=[];
% (when -1 is the reward for going off the left end):
Vtruth = -1 + 2*(0:(n_rw_states+1))/(n_rw_states+1); Vtruth(1)=[]; Vtruth(end)=[];

% a vector of learning parameters with 0.0 and 1.0
%alphaV = linspace( 0, 0.3, 10 );
%alphaV = linspace( 0, 0.3, 20 );
alphaV = linspace( 0, 0.3, 100 );

% a vector of TD(lambda) lambdas:
lamVect = [ 0, 0.2, 0.4, 0.6, 0.8, 0.9, 0.95, 0.975, 0.99, 1.0 ];

results=zeros(length(alphaV),length(lamVect));
for ni=1:length(lamVect),
    lam=lamVect(ni);
    fprintf('working on lambda=%f...\n',lam);
    tra = zeros(1,length(alphaV));
    for ai=1:length(alphaV),
        a = alphaV(ai);
        fprintf('working on alpha=%f...\n',a);
        tr = zeros(1,N_EXPS);
        fprintf('working on experiment number (of %d): ',N_EXPS);
        for ei=1:N_EXPS,
            if( mod(ei,10)==0 ) fprintf('%d, ',ei); end
            V = rw_offline_tdl_learn( lam, a, n_rw_states, nEpisodes );
            tr(ei) = sqrt( mean( (V-Vtruth).^2 ) );
        end
        fprintf('\n');
        tra(ai) = mean( tr );
    end
    results(:,ni) = tra(:);
end

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figure; hold on;
phs=plot( alphaV, results );
xlabel( 'alpha' ); ylabel( ['average rms error from ',num2str(nEpisodes), ' episodes'] );
lamVectCL={};
for ti=1:length(lamVect),
    lamVectCL{end+1} = ['TD(\lambda=',num2str(lamVect(ti)),')'];
end
%legend(phs,lamVectCL,'Location','Best');
legend(phs,lamVectCL,'Location','North');
axis( [ 0.0, alphaV(end), 0.2, 0.55 ] );

saveas(gcf,['./rw_offline_tdl_learn_',num2str(N_EXPS)],'png');

return;

% a simple point case to run:
n = 3;
alpha = 0.1;
rw_offline_ltd_learn
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