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% topPerformAcqHypothesisCalcs
%
% Top-level script for performing acquisition calculations

%----- Setup
clear; clc;
s.C_N0dBHz = 33;
s.N = 34;
s.PfaAcq = 0.0001;
s.Ta = 0.001;
s.fMax = 7000;
s.nCodeOffsets = 1023*5;
s.ZMax = 1000;
s.delZ = 0.1;

%----- Execute
[pZ_H0,pZ_H1,lambda0,Pd,ZVec] = performAcqHypothesisCalcs(s);

%----- Visualize the results
figure(2);
[pmax,iimax] = max(pZ_H1);
Zmax = ZVec(iimax);
clf;
ash = area(ZVec,pZ_H0);
set(get(ash,'children'),'facecolor','g','linewidth',2,'facealpha',0.5);
hold on;
ash = area(ZVec,pZ_H1);
set(get(ash,'children'),'facecolor','b','linewidth',2,'facealpha',0.5);
linemax = 1/5*max([pZ_H0(:);pZ_H1(:)]);
line([lambda0,lambda0],[0,linemax],'linewidth',2,'color','r');
xlim([0 max(Zmax*2,lambda0*1.5)]);
ylabel('Probability density');
xlabel('Z');
fs = 12;
title('GNSS Acquisition Hypothesis Testing Problem');
disp(['Probability of acquisition false alarm (PfaAcq): ' ...
      num2str(s.PfaAcq)]);
disp(['Probability of detection (Pd): ' num2str(Pd)]);
text(lambda0,linemax*1.1,['\lambda_0 = ' num2str(lambda0) ], ...
      'fontsize',fs);
shg

```

Probability of acquisition false alarm (PfaAcq): 0.0001
 Probability of detection (Pd): 0.95407

