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%
% w02w_GEerr_edit.m -- GE truncation error (dhp -- 21 jan 2019)
%

C = 16;          % C = growth of matrix size per loop;
nmax = 64;       % nmax = max value of n for n*C
Nex = 10*100;    % Nex = # of experiments

% data vector of mean residual error for NxN sized matrices
mean_res_err = zeros(nmax,2);

for n = 1:nmax
    % N = size of matrix A
    N = n*C

    % solution of all ones
    x0 = ones(N,1);

    % data vector of errors
    res_err = zeros(Nex,1);

    for kk = 1:Nex
        % make random matrix & b-vector
        A = eye(N,N) + randn(N,N)/sqrt(N);
        b = A*x0;

        % GE via backslash
        x1 = A \ b;

        % rms residual error
        res_err(kk) = rms(A*x1-b);
    end

    % mean_res_error for matrices sized NxN
    mean_res_err(n,1) = N;
    mean_res_err(n,2) = mean(res_err);
end

% plot for mean residual error of NxN sized matrices
figure(1); clf
subplot(1,1,1)
scatter(log10(mean_res_err(:,1)),log10(mean_res_err(:,2)))

xlabel('log_{10}N','fontsize',12)
ylabel(['mean ?_{res}(N) from ' num2str(Nex) ' experiments per N'])
title('log_{10}N vs. mean ?_{res}(N)','fontsize',14)

N =

```

16

$$N =$$

$$32$$

$$N =$$

$$48$$

$$N =$$

$$64$$

$$N =$$

$$80$$

$$N =$$

$$96$$

$$N =$$

$$112$$

$$N =$$

$$128$$

$$N =$$

$$144$$

$$N =$$

$$160$$

$$N =$$

$$176$$

$$N =$$

192

$N =$

208

$N =$

224

$N =$

240

$N =$

256

$N =$

272

$N =$

288

$N =$

304

$N =$

320

$N =$

336

$N =$

352

$N =$

368

$N =$

384

$N =$

400

$N =$

416

$N =$

432

$N =$

448

$N =$

464

$N =$

480

$N =$

496

$N =$

512

$N =$

528

$$N =$$

$$544$$

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$$560$$

$$N =$$

$$576$$

$$N =$$

$$592$$

$$N =$$

$$608$$

$$N =$$

$$624$$

$$N =$$

$$640$$

$$N =$$

$$656$$

$$N =$$

$$672$$

$$N =$$

$$688$$

$$N =$$

$$704$$

$$N =$$

$$720$$

$$N =$$

$$736$$

$$N =$$

$$752$$

$$N =$$

$$768$$

$$N =$$

$$784$$

$$N =$$

$$800$$

$$N =$$

$$816$$

$$N =$$

$$832$$

$$N =$$

$$848$$

$$N =$$

$$864$$

$$N =$$

$$880$$

$N =$

896

$N =$

912

$N =$

928

$N =$

944

$N =$

960

$N =$

976

$N =$

992

$N =$

1008

$N =$

1024

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