```
%N = 10^1 through 10^7

function [singleDifferences, doubleDifferences] = sums (n)

%set to zero, both single and double precision
aSing = single(0);
aDub = 0;
bSing = single(0);
bDub = 0;
cSing = single(0);
cDub = 0;
dSing = single(0);
dDub = 0;

%smallest to largest
for i=n:-1:1

    aSing = single(aSing + (1/i));
    aDub = aDub + (1/i);

    bSing = single(bSing + (1/i^2));
    bDub = bDub + (1/i^2);

    cSing = single(cSing + (1/i^3));
    cDub = cDub + (1/i^3);

    dSing = single(dSing + (((-1)^i)/i));
    dDub = dDub + (((-1)^i)/i);

end

aSingRev = single(0);
aDubRev = 0;
bSingRev = single(0);
bDubRev = 0;
cSingRev = single(0);
cDubRev = 0;
dSingRev = single(0);
dDubRev = 0;

%largest to smallest
for i=1:n

    aSingRev = single(aSingRev + (1/i));
    aDubRev = aDubRev + (1/i);

    bSingRev = single(bSingRev + (1/i^2));
    bDubRev = bDubRev + (1/i^2);

    cSingRev = single(cSingRev + (1/i^3));
    cDubRev = cDubRev + (1/i^3);

    dSingRev = single(dSingRev + (((-1)^i)/i));
    dDubRev = dDubRev + (((-1)^i)/i);
```

```
end

aSingDiff = abs(aSingRev - aSing);
aDubDiff = abs(aDubRev - aDub);

bSingDiff = abs(bSingRev - bSing);
bDubDiff = abs(bDubRev - bDub);

cSingDiff = abs(cSingRev - cSing);
cDubDiff = abs(cDubRev - cDub);

dSingDiff = abs(dSingRev - dSing);
dDubDiff = abs(dDubRev - dDub);


singleDifferences = [aSingDiff, bSingDiff, cSingDiff, dSingDiff];
doubleDifferences = [aDubDiff, bDubDiff, cDubDiff, dDubDiff];
```

```
singleDifferences =

   1.0e-06 *

         0           0   0.1192093   0.0596046


doubleDifferences =

   1.0e-15 *

  Columns 1 through 3

                  0                   0   0.222044604925031

  Column 4

   0.111022302462516
```

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