Question: The infinite series f(n) = sigma^n_k = 1 1/k^4 converges on a value f(n) = pi^4/90 as n approac...

3. The infinite series

$$f(n) = \sum_{k=1}^{n} \frac{1}{k^4}$$

converges on a value $f(n) = \pi^4/90$ as n approaches infinity. Write a program to calculate $f(n)$ for $n = 10,000$ by computing the sum from k=1 to 10,000. Then repeat the calculations but in reverse order - that is, from k=10,000 to 1 using increments of -1. In each case, compute the true percent relative error after each term is added. Compare the final error in the end of the calculations for the two cases. Explain the results.

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Expert Answer

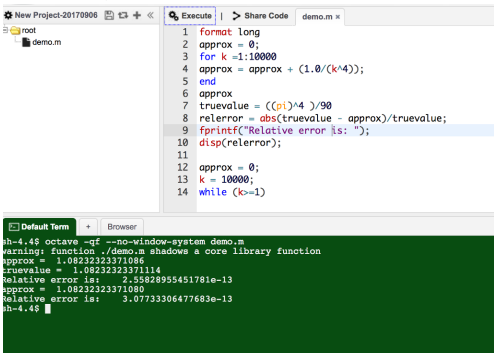
Anonymous
answered this

```
format long
approx = 0;
for k =1:10000
approx = approx + (1.0/(k^4));
end
approx
truevalue = ((pi)^4 )/90
relerror = abs(truevalue - approx)/truevalue;
fprintf("Relative error is: ");
disp(relerror);
```

```
approx = 0;
k = 10000;
while (k>=1)
approx = approx + (1.0/(k^4));
k = k-1;
end
approx
relerror = abs(truevalue - approx)/truevalue;
fprintf("Relative error is: ");
disp(relerror);
```

==========

See Output



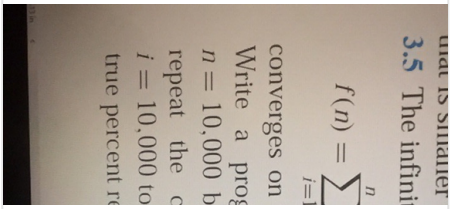
Thanks, let me know if there is any concern.

3 Comments

Was this answer helpful? 0 0

Up next for you in Computer Science

How to solve this question by Excel?



See answer

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write a matlab code for the following infinite series:

See answer

The infinite series f(n) = sigma_k = 1^n 1/k^4 converges on a value f(n) = pi^4/90 as n approaches infinity. Write a program to calculate f(n) for n = 10, 000 by somputing the Sum from k = 1 to k = 10,000. Then repeat the calculations but in reverse order - that is, from k = 10, 000 to 1 using increments of -1. In each case, compute the true percent relative error after each term...

See answer

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