Math 242 Lab 8
Series

Li-An Chen
Department of Mathematical Sciences, University of Delaware
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Lab Assignment

- Complete ALL Lab Assignment Questions (with codes, computation results, and brief essay questions from page 2~3)
- Submit “lastnameLab08.nb”
  and “lastnameLab08.pdf” **(File->Save As→pdf)** on Canvas
- Deadline: **Tomorrow 11:59pm**
- Correct computation results (without codes) are available on Canvas→Files→Lab→Lab_08_Series→lab08_examples_hints

Partial Sums

- s[n_]=Sum[1/k,{k,1,n}]
- This is the sum of the first n terms of the sequence {1,1/2,1/3,1/4,…}
- s[1]=1, s[2]=1+1/2, s[3]=1+1/2+1/3, and so on.
- s[n] only depends on n (the sum of the first n term), but not k.
- s[n] itself is a sequence, called “the sequence of partial sums”

Partial Sums

- The “series” is **s[Infinity]**, or **Limit[s[n],n->Infinity]**
- “Does the series converges?” is the same as asking “Does the sequence of partial sums converges?”
- So the series converges if and only if the sequence of partial sums converges, which means (recall last lab) if Limit[s[n],n→Infinity] is a finite number, which means s[Infinity] is a finite number.

Q2

- Recall Lab2 Newton's Method when we learned List and Append
- t[n_]= Sum[1/k!, {k, 0, n}]
  - Define the partial sum (sum of the first n terms) $\sum_{k=0}^{n} \frac{1}{k!}$
- errors={}
  - Define an empty list whose name is "errors"
- exact = E
  - Because in Q1 we found that s[Infinity]=E $e = \sum_{k=0}^{\infty} \frac{1}{k!}$
- For[m = 1, m<=10, m++, errors = Append[errors, Abs[t[m] – exact]]]
  - See next page
- errors//N
  - Print the result computed by For Loop
- ListLogLogPlot[errors]
  - A plot that both x,y are in Log scale

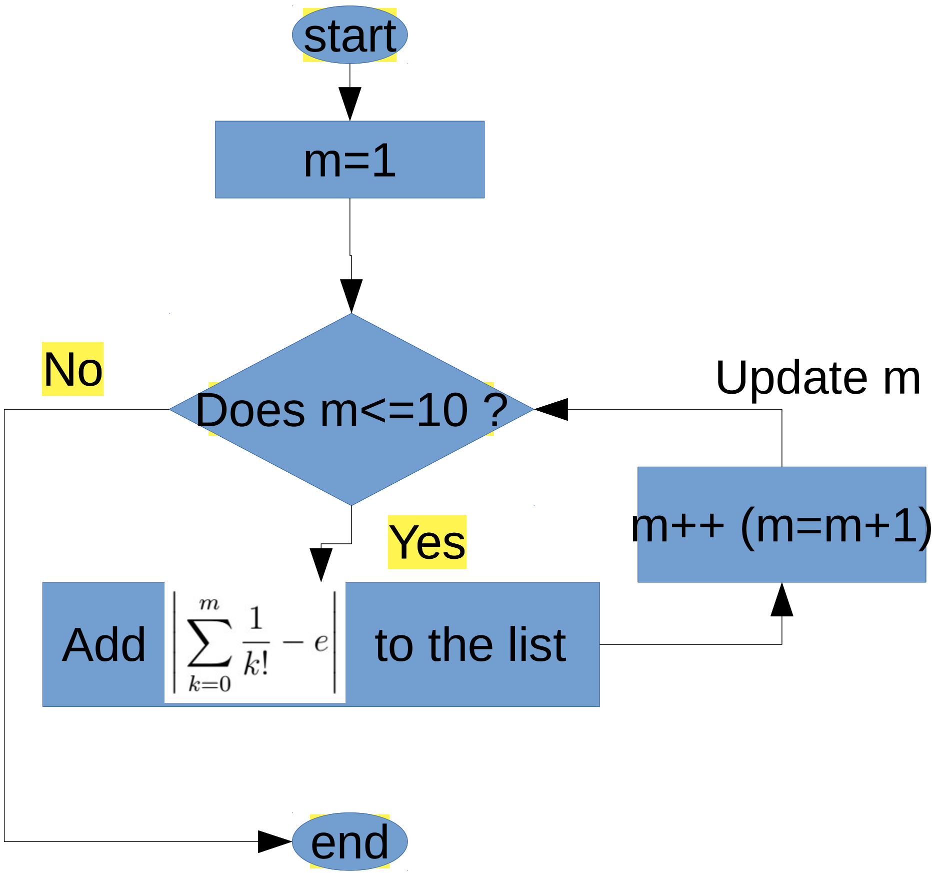
Q2

- For[m = 1,

  m<=10,

  m++,

  errors = Append[errors, Abs[t[m] - exact]]]



Wrong	Correct
ln(k)	Log[k]
e	E, or Exp[1]
pi^2/6	Pi^2/6