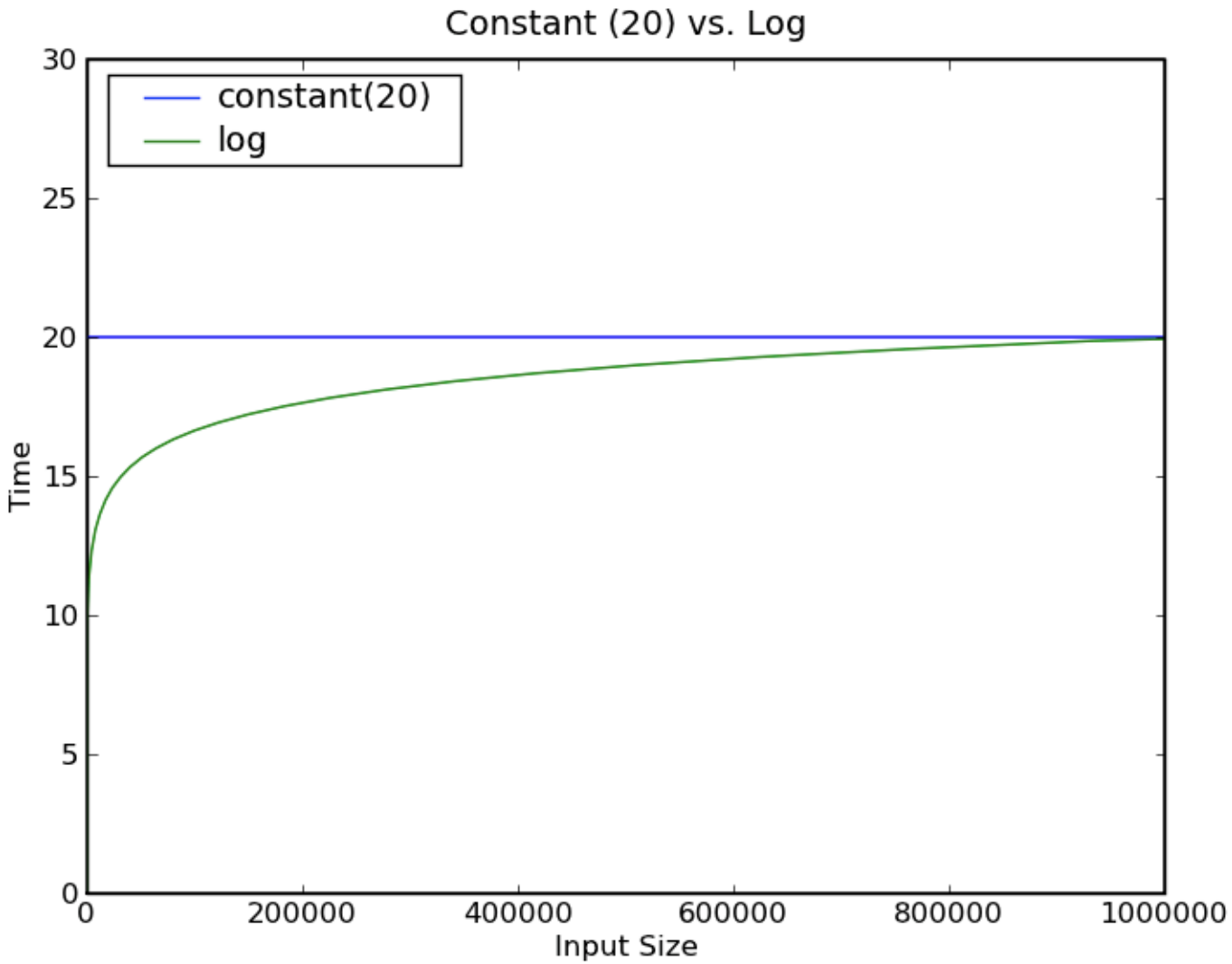
Comparing complexities

- So does it really matter if our code is of a particular class of complexity?
- Depends on size of problem, but for large scale problems, complexity of worst case makes a difference

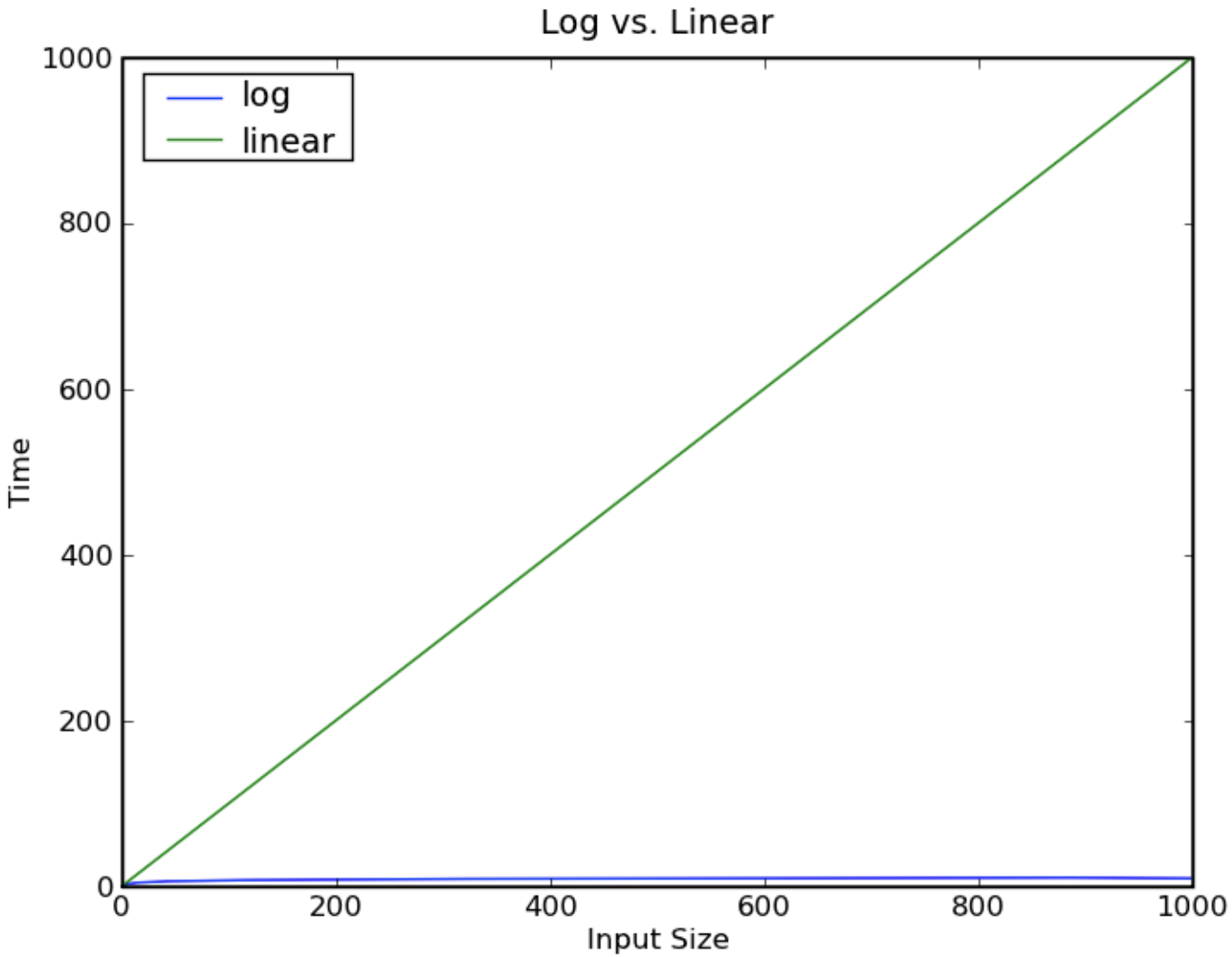
Constant versus logarithmic



Observations

- A logarithmic algorithm is often almost as good as a constant time algorithm
- Logarithmic costs grow very slowly

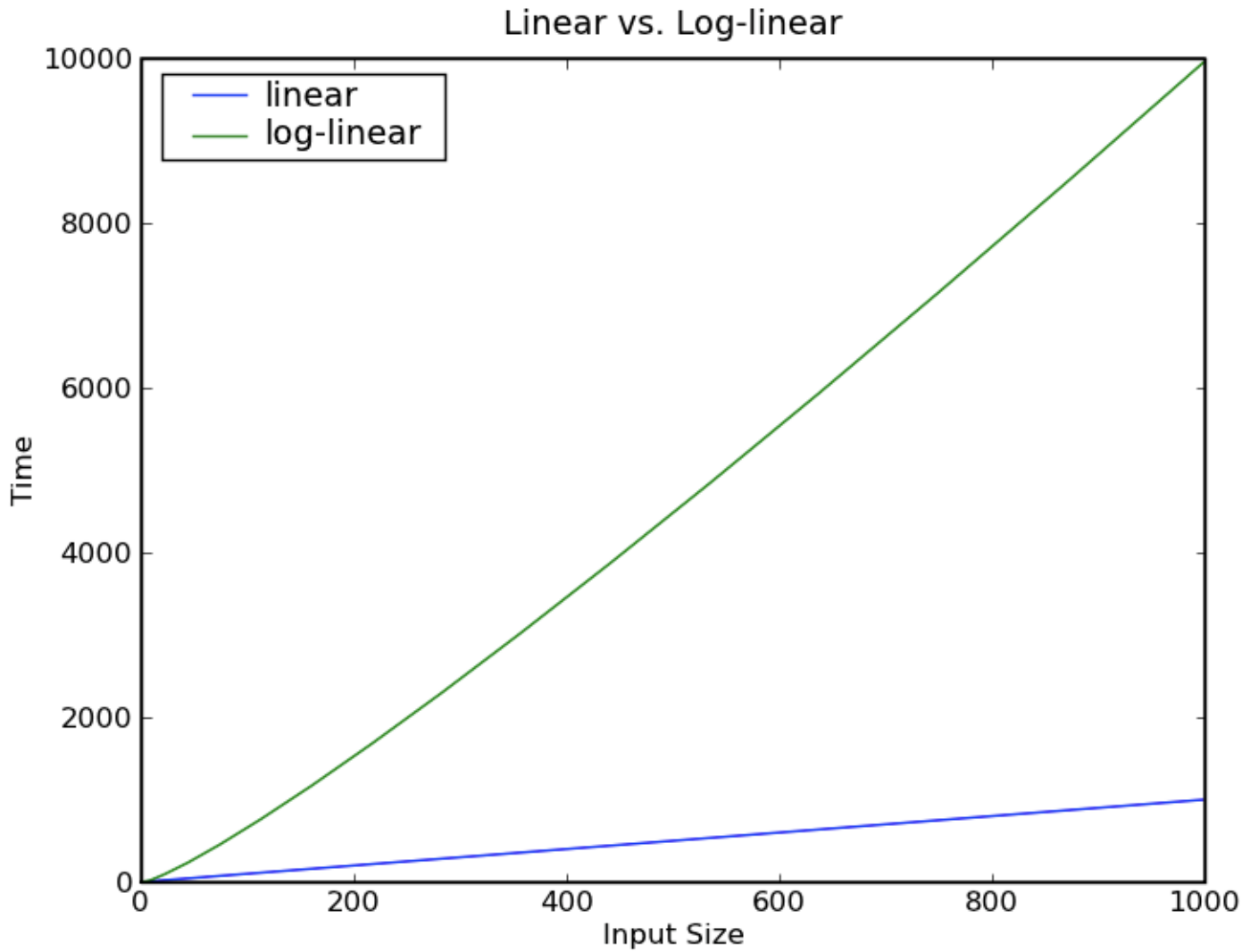
Logarithmic versus Linear



Observations

- Logarithmic clearly better for large scale problems than linear
- Does not imply linear is bad, however

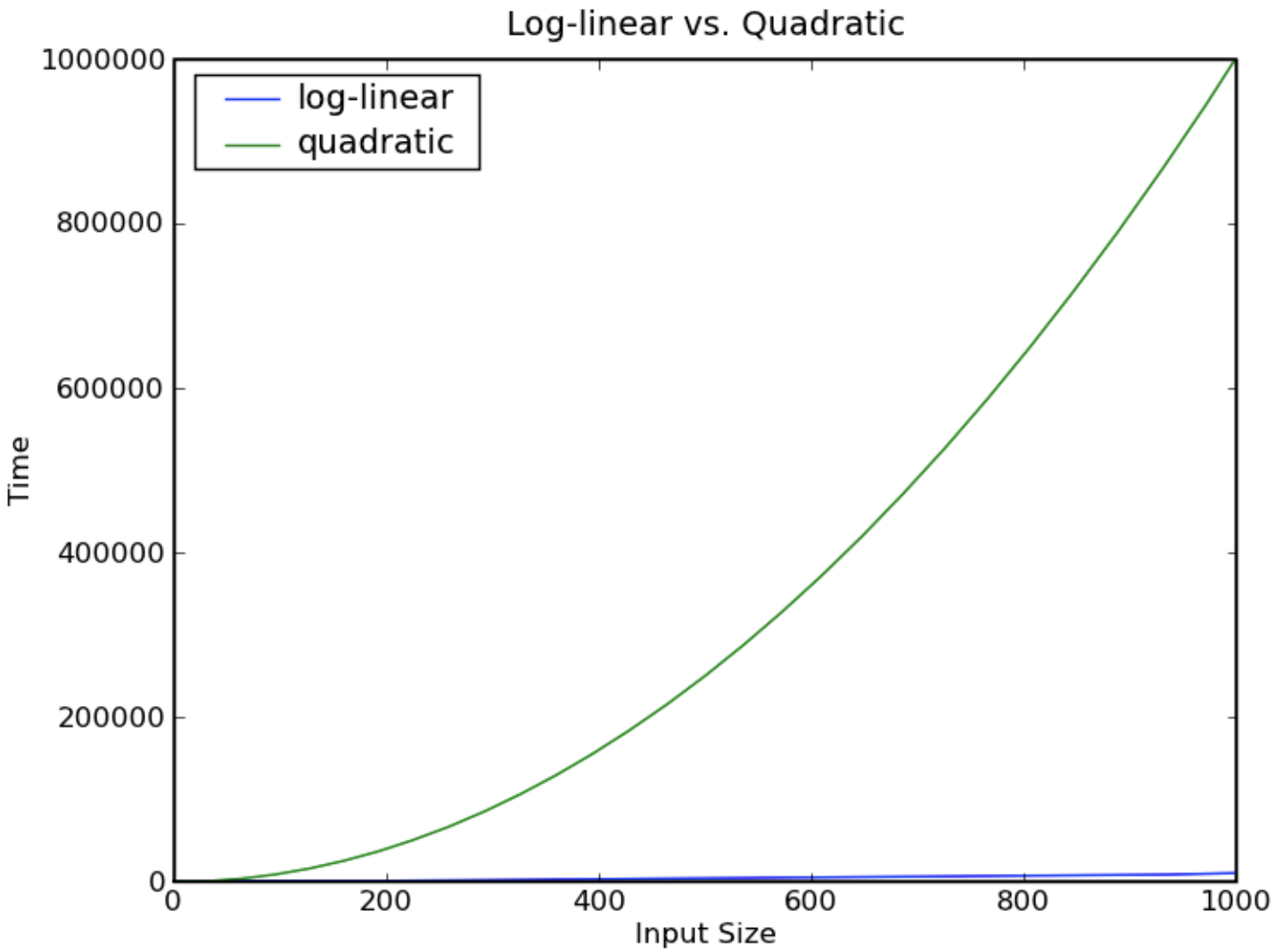
Linear versus Log-linear



Observations

- While *log(n)* may grow slowly, when multiplied by a linear factor, growth is much more rapid than pure linear
- *O(n log n)* algorithms are still very valuable

Log-linear versus Quadratic



Observations

- Quadratic is often a problem, however.
- Some problems inherently quadratic but if possible always better to look for more efficient solutions

Quadratic versus Exponential

- Exponential algorithms very expensive
  - Right plot is on a log scale, since left plot almost invisible given how rapidly exponential grows
- Exponential generally not of use except for small problems