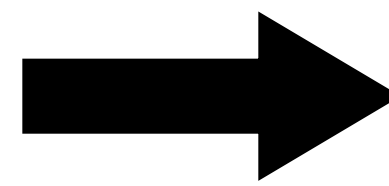


# Granularity & Efficiency

Simple diffusion equation:

$$\frac{\partial \phi}{\partial t} = -\frac{\partial}{\partial x} \left( -\lambda \frac{\partial \phi}{\partial x} \right) - \frac{\partial}{\partial y} \left( -\lambda \frac{\partial \phi}{\partial y} \right) + \frac{\partial}{\partial z} \left( -\lambda \frac{\partial \phi}{\partial z} \right)$$

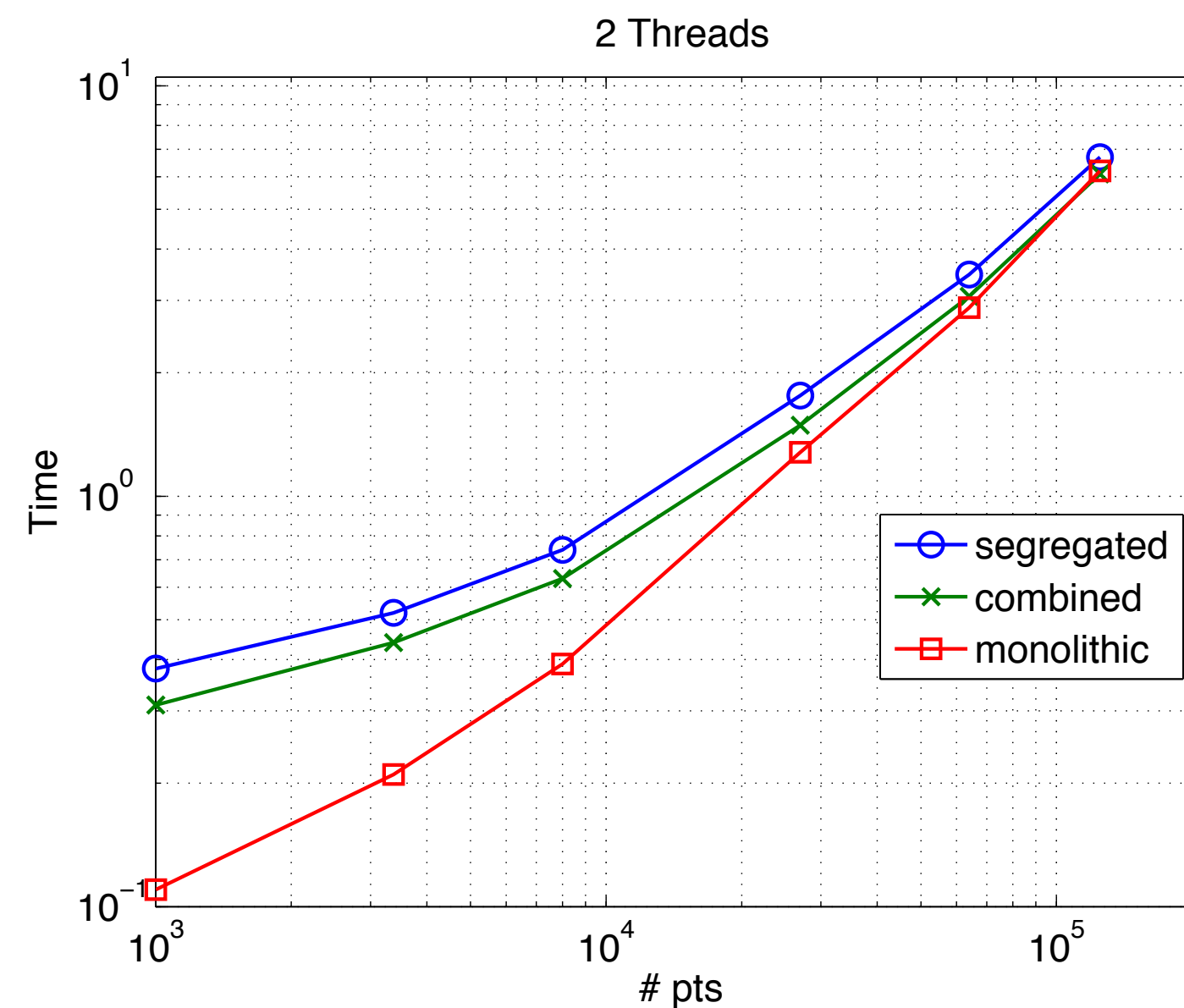
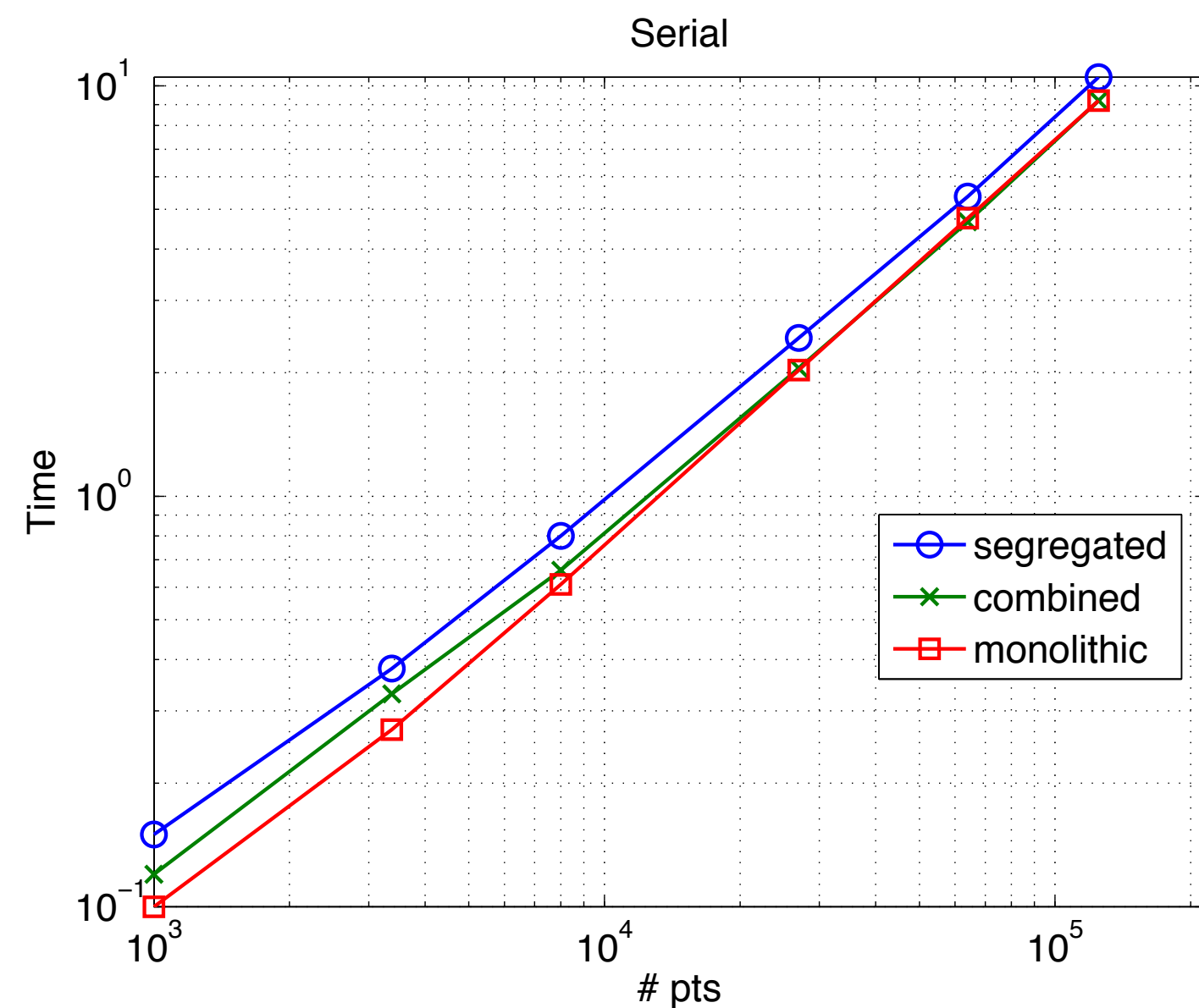


9 stencil applications & 5 multiply/add

Segregated: 13 loops, 4 expressions

Combined: 13 loops, 1 expression

Monolithic: 1 loop, 1 expression



**NOTE:** These results were obtained on a 2-core laptop.

**NOTE:** “n” threads currently results in “n” task threads and “n” nebo threads.

- Overhead of expression graph (difference between segregated & combined) is notable.
- Monolithic maintains parallel scalability