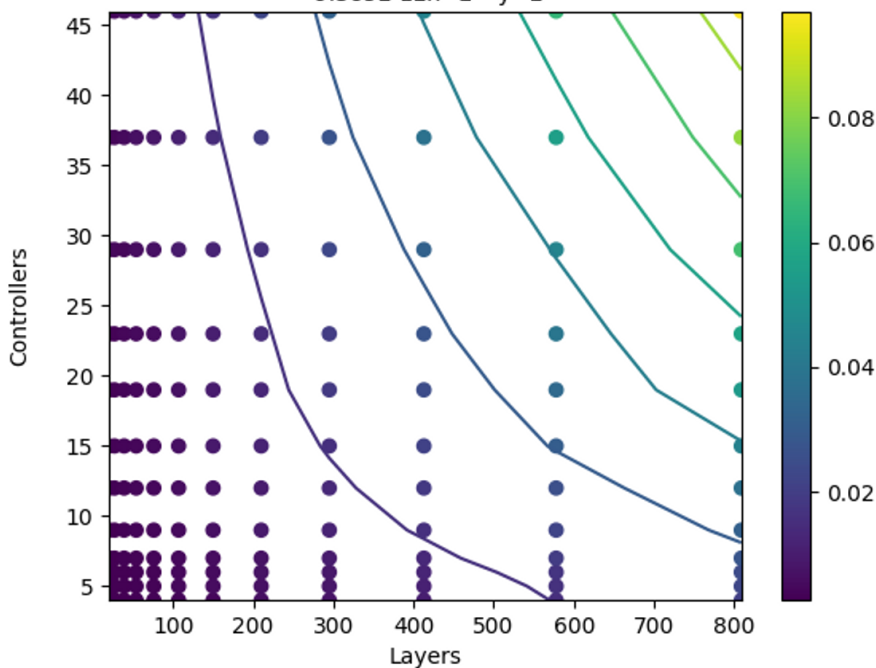# Multiple Controllers

Having multiple controllers does NOT scale linearly (that is, having 2 controllers with 100 layers causes way less lag than 1 controller with 200 layers).

The actual relationship is hard to describe, but here is a visual to maybe help with this. Where every line is a constant frame time. So for example 5 controllers with 580 layers are as laggy as 15 controllers with 300 layers.

Fitted Curve: 2.108E-03 + 7.849E-06y + -4.627E-08y^2 + 1.130E-05x + 1.864E-06x*y + -3.148E-09x*y^2 + 1.275E-09x^2 + 1.095E-09x^2*y + -9.385E-12x^2 * y^2

I see two main takeaways from this graph:

- Big controllers cause a lot of frame time compared to many small ones. Optimization is especially necessary if you have many layers. (1 100 layer controller takes as much frame time as 10 30 layer controllers).
- Even with many controllers, if you halve the layer count on all of them, your total frame time still goes down by 50%. So if everyone optimized their layer count/layer setup, this would increase performance for everyone.

This relation seems the same for all controller types/layer configurations.

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