6. Big picture

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Reflect

Robot Arm Big Picture

And in one place I'll throw out briefly

that it happens a lot is in machine learning.

So in the math department recently,

well every year or two, we send emails

all around the Institute to people in different disciplines

and we ask them what is important for multi-variable

calculus, or whatever class in your discipline

that we should teach?

And so I got an email from the professor who teaches

the machine learning class, and they said two things --

gradients and they said, understanding this.

Yeah, actually over spring break I

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Big picture The robot arm is an example of a transformation.

$$L, \theta \underbrace{\Longrightarrow}_{\text{transformation}} x, y \tag{5.109}$$

which can be a very complicated relationship. In this case, it is complicated because of the $\sin$'s and $\cos$'s.

The linear approximation allows us to simplify what is happening for very small changes. If we consider only small changes in L and θ, the complicated transformation reduces to a matrix.

$$\Delta L, \Delta\theta \underbrace{\Longrightarrow}_{\text{matrix}} \Delta x, \Delta y \tag{5.110}$$

Take away: Any transformation can be modeled by a matrix as long as we consider only small changes.

6. Big picture

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