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## Programming Assignment 5

Bookmark this page

Click this link to download the [Ridge Regression notebook](#) and then complete problems 1-3.

If you are completely stuck on this notebook, you can consult these [hints](#).

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## Problem 1

1/1 point (graded)

In setting the step size, does it make sense in practice to pick a fixed schedule like  $1/t$  (where  $t = 1, 2, 3, \dots$  is the iteration)? Select all that apply.

☐ Yes, that should work well in general.

☒ Not really: it is important to adapt to the scale of the loss function and/or gradient; otherwise, the steps might be much too big or much too small.

☐ Not really: there is no need to reduce the step size with time.

☐ Yes: in fact any schedule that decreases with  $t$  will work well.



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## Problem 2

1/1 point (graded)

Is it possible to design the gradient descent scheme so that the loss values are monotonically decreasing with successive iterations?

☐ Yes: in fact, this is guaranteed to happen in any case.

☐ No: we cannot hope for this if we want guaranteed convergence.

☒ Yes: this can be ensured by choosing a step size adaptively.

☐ No: in general it is not possible to avoid having the loss function go up and down.



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## Problem 3

1/1 point (graded)

In the notebook, the data was generated using a *sparse* regression function  $w$ , in which only **10** of the **100** features were set. Did your solver do a good job of identifying the relevant features? Select all that apply.

☒ Yes, in the sense that the **10** highest-valued coordinates were the relevant features.

☒ In general we should not expect ridge regression to yield sparse solutions.

☐ In general, we should not expect ridge regression to yield sparse solutions.

☐ Yes: the coefficients for the relevant features were at least an order of magnitude larger than the coefficients for other features.



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