Assignment 1

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Table 1 Comparing algorithms for baseline model

	Gradient descent	Newton descent	Coordinate descent
Precision	0.0000998	0.0000881	0.0000990
Total rides	30.078	30.076	30.078
Total price	25.393	25.394	25.394
niter	190	41	16
time taken in sec	0.352	2.411	38.505

The gradient of $E(p)$, used in the Newton descent method is given by

$$\frac{\partial E_z(p)}{\partial z'} = \begin{cases} \Sigma_{y \in Y} m_y \mu^S_{z|y} \left(1 - \mu^S_{z|y}\right) + \Sigma_{x \in X} \mu^D_{z|y} \left(1 - \mu^D_{z|y}\right) & \text{if } z = z' \\ -\Sigma_{y \in Y} m_y \mu^S_{z|y} \mu^S_{z'|y} - \Sigma_{x \in X} \mu^D_{z|y} \mu^D_{z'|y} & \text{if } z \neq z' \end{cases}$$

My algorithm did not converge for the model with subsidy. Out of time!