Assignment 3

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Question

What are KKT conditions? Give relevant equations.
Ans. -
Let Optimization problem is:

$$\begin{aligned} &minimise. \quad f_0(x) \\ &subject.to. \quad f_i(x) \leq 0 \quad i = 1, \ldots, m \end{aligned}$$

$$Lagrangian: \quad L(x, \lambda) = f_0(x) + \sum_{i=1}^{m} \lambda_i f_i(x)$$

There are some necessary condition given by Karush-Kuhn Tucker(KKT):

1.) Feasibility:
$f_i(x*)$ is feasible.
Where x* is primal values.
2.) There will be no direction that can improve objective and is feasible

$$f_0(x*) - \sum_{i=1}^{m} \lambda_i^* f_i(x*) = 0$$

3.) Complementary Slackness

$$\lambda_i^* * f_i(x*) = 0 \quad i = 1, \ldots, m$$

4.) Positive Langrange's Multiplier

$$\lambda_i^* \geq 0 \quad i = 1, \ldots, m$$