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The question requires implementation of a logarithmic barrier. As a result, the barrier function of “barrier_path.m” was changed to the following function:

$$F(x) = -\sum_{j=1}^{k} \log -g(x)$$

And also to calculate the derivative and the hessian explicitly with the provided gradient and Hessian of the constraint function, two functions called “Logarithmic_barrier_grad” and “Logarithmic_barrier_Hessian” wer implemented using the following formulas:

Gradient of barrier function= $\frac{1}{\log -g(x)}$*dg(x)

Hessian of barrier function=$\frac{(ddg(x)*\log -g(x))-(\frac{1}{\log -g(x)}*\mathrm{dg(x)}*dg(x))}{(\log -g(x))^2}$

Newton_barrier was used as the unconstrained subroutine.