Chapter 7

Conclusions

In the present work we investigated if the p-power formulation of a given nonconvex programming problem results in a locally convex equivalent problem, hence allowing us to apply local dual search methods and possibly reducing computational difficulties that may arise in an attempt to find optimal points.

We found that the p-power formulation not only locally convexifies the Lagrangian function associated to a programming problem in the case where $X = \mathbb{R}^n$ and $Y = \mathbb{R}^m$, but also locally convexifies the Lagrangian associated to a programming problem defined on a (possibly infinite-dimensional) Hilbert space X with $Y = \mathbb{R}^m$. We have shown this result with example 1, where the problem is defined on $X = L_2[0,1] \times L_2[0,1]$ and $Y = \mathbb{R}$. With the proper calculations we found the value for p that gives us our locally convex transformed equivalent problem.

Furthermore, we developed an example where not only our feasible set is defined on an infinite-dimensional Hilbert space, but the image of our constraint functions as well. Notably, the convexification through the p-power formulation in this example was successful. It is our belief that under certain conditions the p-power formulation could be used to include such cases, where both X and Y are infinite-dimensional Hilbert spaces. We recommend further investigation on this area.