Operations Research Ph. D. Qualifying Exam
Nonlinear Programming

**Core Topics**

Optimality Conditions

— Karush Kuhn Tucker Conditions
  constraint qualifications, cones, dual cones, tangent cones

Convex Sets and Functions

— convex hulls, supporting hyperplanes, epigraph, hypograph, subgradients, subdifferentials, convexity and optimization

Conjugate Functions

Duality Theory

Convergence Theory

— set-valued and closed mappings, global convergence, local convergence

**Other Topics**

Quadratic Programming

Computational Methods

— line searches, inexact searches, conjugate directions, matrix updates

Complementary Problem

Posynomial Programming

Generalized Convexity

Fixed Point Problems

Variational Inequalities

References:
