

Information on Math 5710. Spring 2009.

Synopsis of topics on mapping theorems, implicit functions and extremum problems in R^n . Sections 41, 42.

Class C^1 of mappings. Injective functions (page 17), Injective Function Theorem 41.5. Surjective Mapping Theorem 41.6, Inversion Theorem 41.8. Implicit functions and Implicit Function Theorem 41.9.

Section 42. Extremum problems, local minima and maxima. First and Second Derivatives Test (Theorems 42.1 and 43.4) - necessary and sufficient conditions for optimality. Extremum problems with constraints. Lagrange Multipliers rule (Theorem 42.7).

Quiz problems - examples.

1. Let

$$F(x, y, w) = [y \cos x - w^2, \ln(x + y) + \sin w]^T$$

Show that we can solve $F(x, y, w) = [0, 0]^T$ for (x, y) in terms of w near $(0, 1, 0)$? If $[x, y]^T = \varphi(w)$ find $D\varphi(0)$.

Homework problems.

Section 41(p.392): 41A, 41E, 41F, 41G, 41O

Section 42(p.408): 42A, 42B, 42G, 42I, 42P, 42S, 42R