Exam 2

Review Sheet

April 17, 2018

The exam will cover sections 2.6, Chapter 3 and 4. Sections labelled optional that we did not cover will not be covered. (This also includes the moving frame and torsion from Section 3.2.) Below lists topics/questions you are likely to see. I also expect to include some True/False questions.

- Be able to prove Theorem 6.3 of section 2.6, and be able to use it.

- Be able to calculate the velocity, speed and acceleration of a path.

- Be able to calculate the length of a path

- Be able to calculate flow lines, sketch a vector field.

- Be able to calculate the gradient, divergence and curl and be able to use them.

- Find the first order and second order Taylor polynomial of a multivariable function

- Be able to identify critical points of a multivariable function, and determine their nature

- Be able to use Lagrange multipliers to identify critical points of a function subject to a given constraint(s). (It would be too cumbersome a test question to ask you to use the second derivative test for constrained local extrema.)

- Be able to use these techniques to solve regression problems (don't memorize formulas, please!) and basic utility problems in economics.

Definitions to know:

- directional derivative of f at $\mathbf{a}$ in the direction of $\mathbf{v}$, and know how to compute it using the dot product

- path, speed, acceleration

- vector field, flow line

- del operator, divergence of F and the curl of F

- incremental change of f, total differential of f

- Hessian of a function

- local maximum, local minimum

- compact