MVE041 Flervariabelanalys 2015 Passing/Mastery Week 5

1 Passing Part

§14.3 Improper Double Integrals

- Determine whether a double integral is improper and if so, what properties make it improper.

§14.5, 14.6 Triple Integrals

- Compute relatively simple triple integrals over bounded domains in cartesian coordinates.
- Know the transformations between cartesian coordinates and cylindrical and spherical coordinates as well as in the inverse transformations. Be able to compute the volume form for these coordinate systems, as well as for other given changes of variables.
- Can compute relatively simple triple integrals over bounded domains in cylindrical and spherical coordinates, and with a given variable substitution.

§15.1 Vector Fields

- Understand the concept of a vector field, and be able to give examples.
- Given an expression for a simple vector field be able to make a representative sketch.
- Understand and be able to give the definition of an integral curve (field lines) of a vector field.
- Given a simple vector field, can obtain the equations of the integral curves and sketch them.

Reduction of Second Order ODE

- Be able to reduce a second order ordinary differential equation (ODE) to a system of first order ODE. Sketch the vector field corresponding to the right hand side, and the integral curves.

2 Mastery Part

§14.3 Improper Double Integrals

- For functions $f(x, y) \geq 0$, be able to determine whether an improper double integral diverges or converges. Evaluate integrals which converge.

§14.5, 14.6 Triple Integrals

- Evaluate more difficult triple integrals in cartesian, cylindrical, and spherical coordinates. Be able to introduce and use general variable transformations in order to solve a difficult triple integral.