Norwegian University of Science and Technology
Department of Mathematical Sciences

TMA4115, Spring 2013, Test 3

Exercise group number:

Name:

NTNU username:_____@stud.ntnu.no

You have 20 minutes to solve the 3 problems. Each problem is worth 10 points, and you need at least 15 points to pass the test. Your answers must be written on this sheet of paper (you can use additional sheets if you need more space for your answers). You are allowed to use a Citizen SR-270X or Hewlett Packard HP30S calculator, and Rottman's "Matematisk formelsamling", but no books or notes.

Problem 1 Find the general solution of the differential equation $y'' + y = \cos(t)$.

Problem 2 Find a particular solution of the differential equation $y'' - 2y' + y = \frac{e^t}{t^2+1}$.

Problem 3 The motion of a mechanical system is described by the differential equation $y'' + 2y' + 5y = 2\sqrt{5}\cos(\sqrt{5}t)$. Determine whether the motion is under-damped, over-damped or critically damped and find the steady-state term of the motion.