Additional questions

Midterm 2014 Q2

Use the **Extreme Value theorem** to optimise

the function $f(x,y) = e^{-(x^2+y^2)}$

subject to the constraint $x^2 + 4y^2 \le 4$.

Critical points are (2,0) , (-2,0)

f(0,0) is an absolute max. , f(2,0) and f(-2,0)

Midterm 2013 Q2

Use **Extreme Value theorem** to optimise

the function $f(x,y) = x^2y - 2xy^2 + 3xy + 4$

subject to the constraint $y + 4x \le 1$; $y \ge 1$ and $x \ge -2$.

f(-2,4) absolute max. f(-0.5,1) is an absolute minimum

2. Find all critical points of $f(x,y) = xe^{-x}(y^2 - 4y)$ and use the second derivative test to classify the points whether they are *relative maximum*, *relative minimum*, *saddle point* or *neither*. **(6 marks)**

Solution : (0,0) and (0,4) are saddle points and (1,2) is a relative minimum.

5. Use Lagrange Multiplier method to find the *optimum* value of

$$f(x,y) = \frac{1}{2}x - y + 6 \quad \text{subject to} \quad x + e^{-x} - y \le 0 \quad \text{and} \quad x \le 2 .$$ **(8 marks)**

The critical point is (0.693, 0.193) and the optimum value is 6.1535