ECON 8 (3) HW Questions for Chapter 11.

Sec. 11.2.

3. Find $f_1'(x,y)$, $f_2'(x,y)$ and $f_{12}''(x,y)$ for the following

(b) $f(x,y) = x^5 \ln y$

(c) $f(x,y) = (x^2 - 2y^2)^5$

4 (f) Find $f_1(x,y)$, $f_2'(x,y)$ for $z = \sqrt{x^2+y^2}$

5. Find $f_1'(x,y)$, $f_{11}''(x,y)$, $f_{12}''(x,y)$ for
$f_2'(x,y)$, $f_{22}'(x,y)$

(a) $z = x^2 + e^{2y}$

(c) $z = xy^2 - e^{xy}$

Sec. 11.6.

1. Calculate $F_1'(1,1,1)$, $F_2'(1,1,1)$ and $F_3'(1,1,1)$ for $F(x,y,z) = x^2 e^{xz} + y^3 e^{xy}$

4. Find the Hessian Matrix of

(b) $g(x,y,z) = Ax^a y^b z^c$

Sec. 11.7

1. Find $\frac{\partial M}{\partial Y}$, $\frac{\partial M}{\partial r}$ for $M = 0.14Y + 76.03(r-2)^{-0.84}$ $(r>2)$
& discuss the signs of the derivatives. M is money demand & Y is national income, r is interest rate. Consider the meaning of the derivatives.

2. If a and b are constants, compute the expression $KY_K' + LY_L'$ for

(b) $Y = AK^a L^b$

(c) $Y = \frac{K^2 L^2}{aL^3 + bK^3}$

3. $D(p,q) = a - bpq^{-\alpha}$ where $a, b > 0$, $0 < \alpha < 1$.
Find $D_p'(p,q)$ & $D_q'(p,q)$ & comment on the signs.
When p is the own price & q is the price of substitute good, discuss the derived derivatives.

4. Let $F(K,L,M) = AK^a L^b M^c$. Show that

$$KF_K' + LF_L' + MF_M' = (a+b+c)F.$$

Sec. 11.8.

1. Find the partial elasticities of z w.r.t. x and y for

(b) x^2y^5

(c) $z = x^n e^x y^n e^y$

Review problems

4. The annual herring catch is given by the function $Y(K,S) = 0.06157K^{1.356}S^{0.562}$ of the catching effort K and the herring stock S.

(a) Find $\frac{\partial Y}{\partial K}$ and $\frac{\partial Y}{\partial S}$

(b) if K and S are both doubled, what happens to the catch?

9. Verify that the points $(-1,5)$ and $(1,1)$ lie on the same level curve for the function $g(x,y) = (2x+y)^3 - 2x + \frac{5}{y}$.

11. (a) if $f(x,y) = x^4 + 2y^2 - 4x^2y + 4y$, find $f_1'(x,y)$ and $f_2'(x,y)$.

(b) Find all pairs (x,y) which solve both equations $f_1'(x,y) = 0$ and $f_2'(x,y) = 0$.