MA-240 Homework Questions

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2.1 Prove that if $f(c) = 0$, then $y = c$ is a solution to $y' = f(y)$, also known as the "Equilibrium Solution".

4.1 Let F be a set of functions. Prove that if $0 \in F$, than F is linearly dependent.

4.1 Let F be a set of functions. Prove that $F = \{f_1, f_2\}$ is linearly dependend if and only if $f_1 = kf_2$.

4.1.3 Prove that if

$$y_{p_j} \text{ solves } \sum_{i=0}^{n} a_i(x) y_i^{(i)} = g_j(x) \text{ for } j = 1, 2, \cdots, m$$

then

$$\sum_{j=1}^{m} y_{p_j} \text{ solves } \sum_{i=0}^{n} a_i(x) y_i^{(i)} = \sum_{j=1}^{m} g_j(x)$$

4.6 Show that using $c = 0$ leads to the same answer for y.

4.7 For the cases where there is one solution for m, and for the case where m has imaginary solutions, check that $W(y_1, y_2) \neq 0$ on the interval.