MATH 2111: Additional Explanations and Hints to Week 4 Tutorial

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Abstract

This document is provided as a part of supplemental materials for MATH 2111 Matrix Algebra and Applications (2015 autumn). Although it is written in the hope that it will be useful, nothing contained in this document represents the official views or policies of this course. Comments and suggestions are welcomed to be sent to the author (xweiaf@connect.ust.hk).

1 Problem 9

Hint: denote $p = u+v, q = v+w, r = w+u$, then it is straight forward to write

$$\begin{cases} u =(u+v)-(v+w)+(w+u)-u, \\ v =(v+w)-(w+u)+(u+v)-v, \\ w =(w+u)-(u+v)+(v+w)-w. \end{cases} \tag{1}$$

Therefore,

$$\begin{cases} u =\frac{1}{2}(p-q+r), \\ v =\frac{1}{2}(p+q-r), \\ w =\frac{1}{2}(-p+q+r). \end{cases} \tag{2}$$

2 Problem 10

Counter example when the columns of an augmented matrix form a linearly dependent set but the linear system is inconsistent:

$$\left(\begin{array}{cc|c} 1 & 2 & 1 \\ 2 & 4 & 1 \end{array}\right). \tag{3}$$