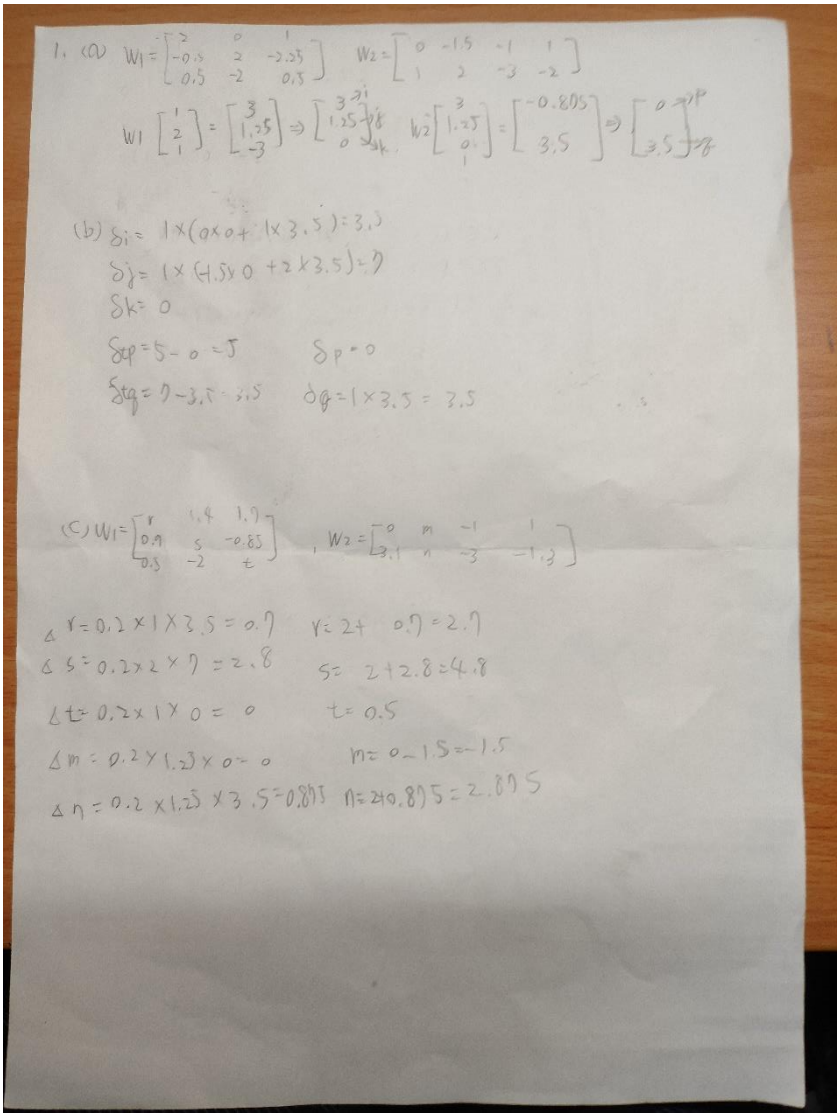


1. (a) $W_1 = \begin{bmatrix} 2 & 0 & 1 \\ -0.5 & 2 & -2.5 \\ 0.5 & -2 & 0.5 \end{bmatrix}$ $W_2 = \begin{bmatrix} 0 & -1.5 & -1 & 1 \\ 1 & 2 & -3 & -2 \end{bmatrix}$

$W1 \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix} = \begin{bmatrix} 3 \\ 1.25 \\ -3 \end{bmatrix} \Rightarrow \begin{bmatrix} 3 \\ 1.25 \\ 0 \end{bmatrix}$ $W_2 \begin{bmatrix} 3 \\ 1.25 \\ 0 \\ 1 \end{bmatrix} = \begin{bmatrix} -0.805 \\ 3.5 \end{bmatrix} \Rightarrow \begin{bmatrix} 0 \\ 3.5 \end{bmatrix}$

(b) $\delta_i = 1 \times (0 \times 0 + 1 \times 3.5) = 3.5$

$\delta_j = 1 \times (1.5 \times 0 + 2 \times 3.5) = 7$

$\delta_k = 0$

$\delta_{ip} = 5 - 0 = 5$ $\delta_p = 0$

$\delta_{iq} = 7 - 3.5 = 3.5$ $\delta_q = 1 \times 3.5 = 3.5$

(c) $W_1 = \begin{bmatrix} r & 1.4 & 1.7 \\ 0.9 & s & -0.85 \\ 0.5 & -2 & t \end{bmatrix}$, $W_2 = \begin{bmatrix} 0 & m & -1 & 1 \\ 3.1 & n & -3 & -1.3 \end{bmatrix}$

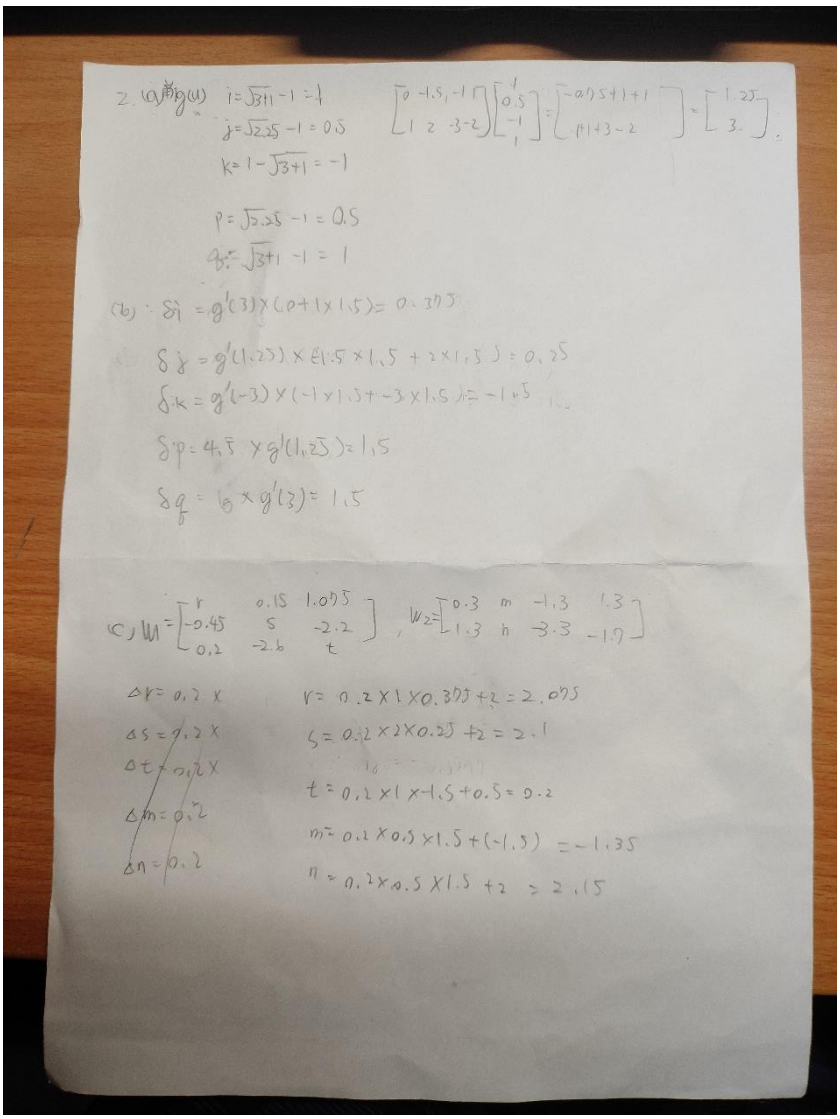
$\Delta r = 0.2 \times 1 \times 3.5 = 0.7$ $r = 2 + 0.7 = 2.7$

$\Delta s = 0.2 \times 2 \times 7 = 2.8$ $s = 2 + 2.8 = 4.8$

$\Delta t = 0.2 \times 1 \times 0 = 0$ $t = 0.5$

$\Delta m = 0.2 \times 1.2 \times 0 = 0$ $m = 0 - 1.5 = -1.5$

$\Delta n = 0.2 \times 1.25 \times 3.5 = 0.875$ $n = 2 + 0.875 = 2.875$



2. (a) $i = \sqrt{3+1} - 1 = 1$

$j = \sqrt{2.25} - 1 = 0.5$

$k = 1 - \sqrt{3+1} = -1$

$\begin{bmatrix} 0 & -1.5 & -1 \\ 1 & 2 & -3 \end{bmatrix} \begin{bmatrix} 1 \\ 0.5 \\ -1 \\ 1 \end{bmatrix} = \begin{bmatrix} -0.75+1+1 \\ 1+1+3-2 \end{bmatrix} = \begin{bmatrix} 1.25 \\ 3 \end{bmatrix}$

$p = \sqrt{2.25} - 1 = 0.5$

$q = \sqrt{3+1} - 1 = 1$

(b) $\delta i = g'(3) \times (0+1 \times 1.5) = 0.375$

$\delta j = g'(1.25) \times (1.5 \times 1.5 + 2 \times 1.5) = 0.25$

$\delta k = g'(-3) \times (-1 \times 1.5 + -3 \times 1.5) = -1.5$

$\delta p = 4.5 \times g'(1.25) = 1.5$

$\delta q = 6 \times g'(3) = 1.5$

(c) $W1 = \begin{bmatrix} r & 0.15 & 1.075 \\ -0.45 & s & -2.2 \\ 0.2 & -2.6 & t \end{bmatrix}$, $W2 = \begin{bmatrix} 0.3 & m & -1.3 & 1.3 \\ 1.3 & n & -3.3 & -1.7 \end{bmatrix}$

$\Delta r = 0.2 \times$

$\Delta s = 0.2 \times$

$\Delta t = 0.2 \times$

$\Delta m = 0.2$

$\Delta n = 0.2$

$r = 0.2 \times 1 \times 0.375 + 2 = 2.075$

$s = 0.2 \times 2 \times 0.25 + 2 = 2.1$

$t = 0.2 \times 1 \times -1.5 + 0.5 = 0.2$

$m = 0.2 \times 0.5 \times 1.5 + (-1.5) = -1.35$

$n = 0.2 \times 0.5 \times 1.5 + 2 = 2.15$