

## IMLPR Homework #09 Solutions

### 1. Chain Clustering

- (a)  $x_1, x_2, x_3, x_4, x_5$  belong to  $z_1$ ;  $x_6, x_7, x_8$  belong to  $z_2$
- (b)  $x_1, x_2, x_3, x_4$  belong to  $z_1$ ;  $x_5, x_6, x_7, x_8$  belong to  $z_2$
- (c)  $x_i \in z_i$
- (d)  $x_9 \in z_1$  or  $z_2$
- (e)  $x_9, x_8, x_5, x_2$  belong to  $z_1$ ;  $x_7, x_6$  belong to  $z_2$ ;  $x_4, x_3, x_1$  belong to  $z_3$

### 2. Criterion Functions

For Group #1

- (a)  $S_w = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ ,  $S_B = \begin{bmatrix} 8 & 4 \\ 4 & 2 \end{bmatrix}$
- (b)  $J_e = 4$

For Group #2

- (a)  $S_w = \frac{1}{15} \begin{bmatrix} 52 & 4 \\ 4 & 28 \end{bmatrix}$ ,  $S_B = \frac{1}{15} \begin{bmatrix} 98 & 56 \\ 56 & 32 \end{bmatrix}$
- (b)  $J_e = 16/3$

- (c) Group #1