

$$X = \begin{pmatrix} 1 & x_{11} & x_{12} & x_{13} \\ \vdots & \vdots & \vdots & \vdots \\ 1 & x_{n1} & x_{n2} & x_{n3} \end{pmatrix} = \begin{pmatrix} 1 & x_{11} & x_{12} & x_{11} + x_{12} \\ \vdots & \vdots & \vdots & \vdots \\ 1 & x_{n1} & x_{n2} & x_{n1} + x_{n2} \end{pmatrix}$$

$\text{rang } X \leq 3$ want 4^e kolom afh. van kolom 2 en 3.

lemma A op p. 566 regt. $X^T X$ is singulier, inverse niet mogelijk

B2 9

$$Y_1 = X_1$$

$$Y_i = X_i - X_{i-1} \quad i = 1, \dots, n$$

$$Y = \begin{pmatrix} 1 & 0 & & 0 \\ -1 & 1 & & 0 \\ 0 & -1 & 1 & 0 \\ \vdots & \vdots & \vdots & \vdots \\ 0 & 0 & & -1 \end{pmatrix} X$$

$$\Sigma_{YY} = A \sigma^2 I A^T = \sigma^2 A A^T$$

$$a_{ii} = 1 \\ a_{i-1,i} = -1$$

$$(A A^T)_{ij} = \sum_{k=1}^n \sum_{l=1}^n a_{ik} a_{lj} = \begin{cases} 1 & \text{als } i=j=1 \\ 2 & \text{als } i=j \geq 2 \\ -1 & \text{als } |i-j|=1 \\ 0 & \text{anders.} \end{cases}$$

$$\Sigma_{YY} = \begin{pmatrix} 1 & -1 & & 0 \\ -1 & 2 & & 0 \\ 0 & -1 & 2 & 0 \\ \vdots & \vdots & \vdots & \vdots \\ 0 & 0 & & -1 \end{pmatrix}$$