

## MATB24. Quiz #4, TUT #

- (1) (4 point) In each part, give a complete definition, or mathematical characterization of the word in bold.
- (a)  $A$  and  $B$  are  $n \times n$  matrices which are **similar**
- (2) (4 point) True or false? Justify your answer. That is give an explicit counter example if you think the statement is false, or prove the statement if you think it is True.
- (a) Let  $\mathcal{B}$  and  $\mathcal{E}$  be ordered bases. If  $C_{\mathcal{B} \rightarrow \mathcal{E}} = I$  then  $\mathcal{B} = \mathcal{E}$ .
- (3) (7 point) Carefully answer the following:
- (a) Let  $V$  and  $W$  be  $n$  and  $m$  dimensional  $F$ -vectorspaces and let  $\mathcal{B}$  and  $\mathcal{A}$  be bases for  $V$  and  $W$  respectively. Let  $T_{\mathcal{B}} : V \rightarrow F^n$  and  $T_{\mathcal{A}} : W \rightarrow F^m$  denote the coordinate isomorphisms. Let  $S : V \rightarrow W$  be a linear transformation. Prove that  $\text{Col}[S]_{\mathcal{B}, \mathcal{A}} = T_{\mathcal{A}}(\text{Img} S)$ .