

## Lecture 9 -

He did an example without, video or recording.

The  $\Delta$  jacobian matrix, is the matrix that defines the kinematic relationships between the  $\Delta l$  and the different degrees of freedom.

↳ We have 2 more past exams to do on our own.

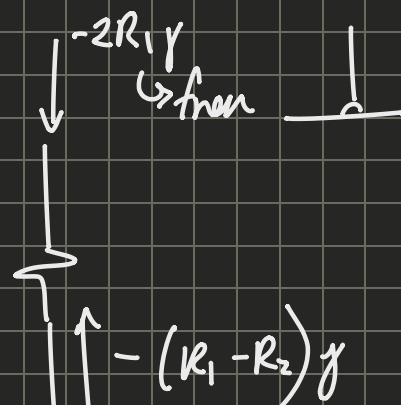
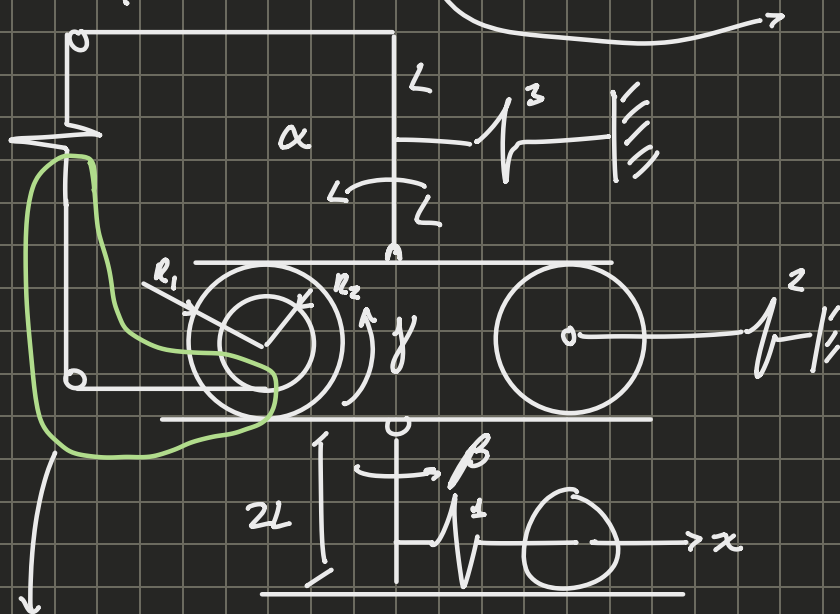
The entries can be seen on the relative motions.

For the exam from 13/02, the tricky one is 3.

13/02

↳ relative, but we are moving the system of reference so it is absolute

	$\alpha$	$\beta$	$\gamma$	$x$
$\Delta l_1$	0	0	0	1
$\Delta l_2$	0	0	$R_1$	0
$\Delta l_3$	$L$	0	$2R_1$	0
$\Delta l_4$	$-2L$	0	$-3R_1 + R_2$	0



$$-2R_1\gamma + -(R_1 - R_2)\gamma = (-3R_1 + R_2)\gamma$$

when moving  $\alpha$ ,  $\gamma$  is fixed, so this part does not move.

All these are entries are the effects on each spring, when we unfreeze one dot at a time.

