

## EXTRA CREDIT QUESTION:

2. Can you find a way to estimate the intrinsic and extrinsic parameters from only two images of the grid? What assumptions on the intrinsic parameters are needed to achieve this. (Hint the answer can be found in Sec 2.4)

We know that if we observe  $n$  images of the model plane, we have  $Vb = 0$  where  $V$  is a  $2n \times 6$  matrix.

When we have  $n \geq 3$  we have a unique solution  $b$  from  $Vb = 0$  defined up to a scale factor. But when we have only two images, i.e.  $n=2$ , we will have to impose a skewness constraint where  $\gamma = 0$ , that is,  $[0, 1, 0, 0, 0, 0]b = 0$ , which is added as an additional equation, i.e., if only 2 images are available, we can impose the skewness constraint  $\gamma = 0$ .

But if we have  $n=1$ , we can only solve two camera intrinsic parameters  $\alpha$  and  $\beta$ , assuming  $u_0$  and  $v_0$  are known and  $\gamma = 0$ .