

$$\mathbb{R}^\infty = \{(\alpha_1, \alpha_2, \dots) \in \mathbb{R}^\infty \mid \alpha_i \in \mathbb{R}\} \quad \swarrow \text{infinite dimensional}$$

$$U \subset \mathbb{R}^\infty$$

$$U = \{(\alpha_1, \alpha_2, \dots) \in \mathbb{R}^\infty \mid \alpha_{i+2} = \alpha_{i+1} + \alpha_i \quad \forall i\}$$

dim  $U$ ?

Prove  $U$  finite dimensional? then find

length of basis <sup>vecs</sup> gives dim  $U$  AND shows finite dimensionality

CLAIM: There is only one such sequence  
 $(\alpha_1, \alpha_2, \dots) \mid \alpha_{i+2} = \alpha_{i+1} + \alpha_i$

$$(0, 0, \dots, 0; 0, \dots) \leftarrow$$

$$(\alpha_1, \alpha_2, (\alpha_1 + \alpha_2), (2\alpha_2 + \alpha_1), 2\alpha_1 + 3\alpha_2, \\ 3\alpha_1 + 5\alpha_2, \dots)$$