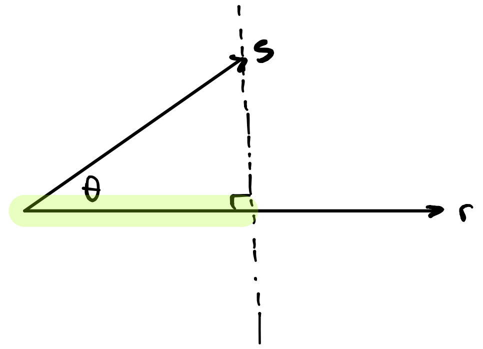
If you draw a triangle



$$\cos\theta = \frac{adj}{hyp}$$

$$= \frac{adj}{|s|}$$

$$= \frac{\left(\frac{r \cdot s}{|r|}\right)}{|s|}$$

$$= \frac{r \cdot s}{|r||s|}$$

The proof illustrates that

$adj = |s|\cos\theta$.

This equivalence can be found in the dot product; and be understood as representing $\boxed{adj}$.

, given $r \cdot s = |r||s|\cos\theta$

and $adj = hyp \cos\theta$

$= |s|\cos\theta$

$= \frac{r \cdot s}{|r|}$

The scalar projection is,

$$\frac{r \cdot s}{|r|} = |s|\cos\theta$$

and is understood as the projection of one vector onto another.

In general the dot-product is also known as the projection product.

Vector projection is the projection of a vector onto another - multiplied by the normalized unit vector of the base ("r") vector.

$$\frac{r}{|r|} \times \frac{r \cdot s}{|r|} = \frac{r(r \cdot s)}{|r||r|}$$

$$= r \times \frac{(r \cdot s)}{r \cdot r}$$

, the vector projection includes the scalar projection as a scaler multiplied by the unit vector of 'r'.

Takeaways,

1. size/modulus of a vector
2. found the dot product
3. found mathematical operations we can do w- dot product
   - I. distributive over vector addition
   - II. associative over scaler multiplication
   - III. commutative
4. ~~dot-product~~ properties of dot product
   - I. finds the angle between to vectors
   - II. the relative directions of the vectors.