VECTORS

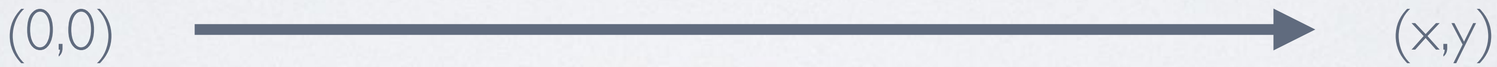
but simply,

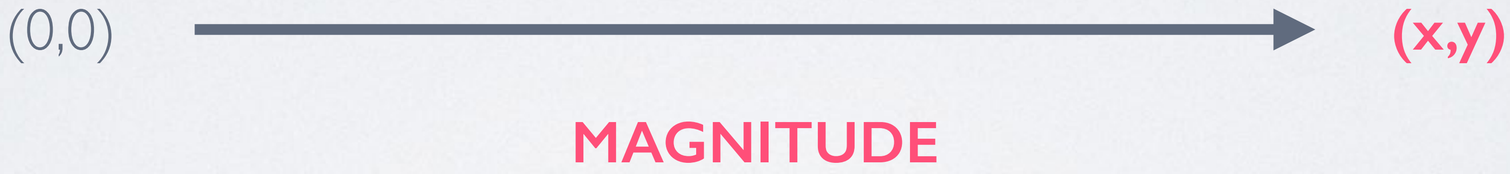
object

(x, y)

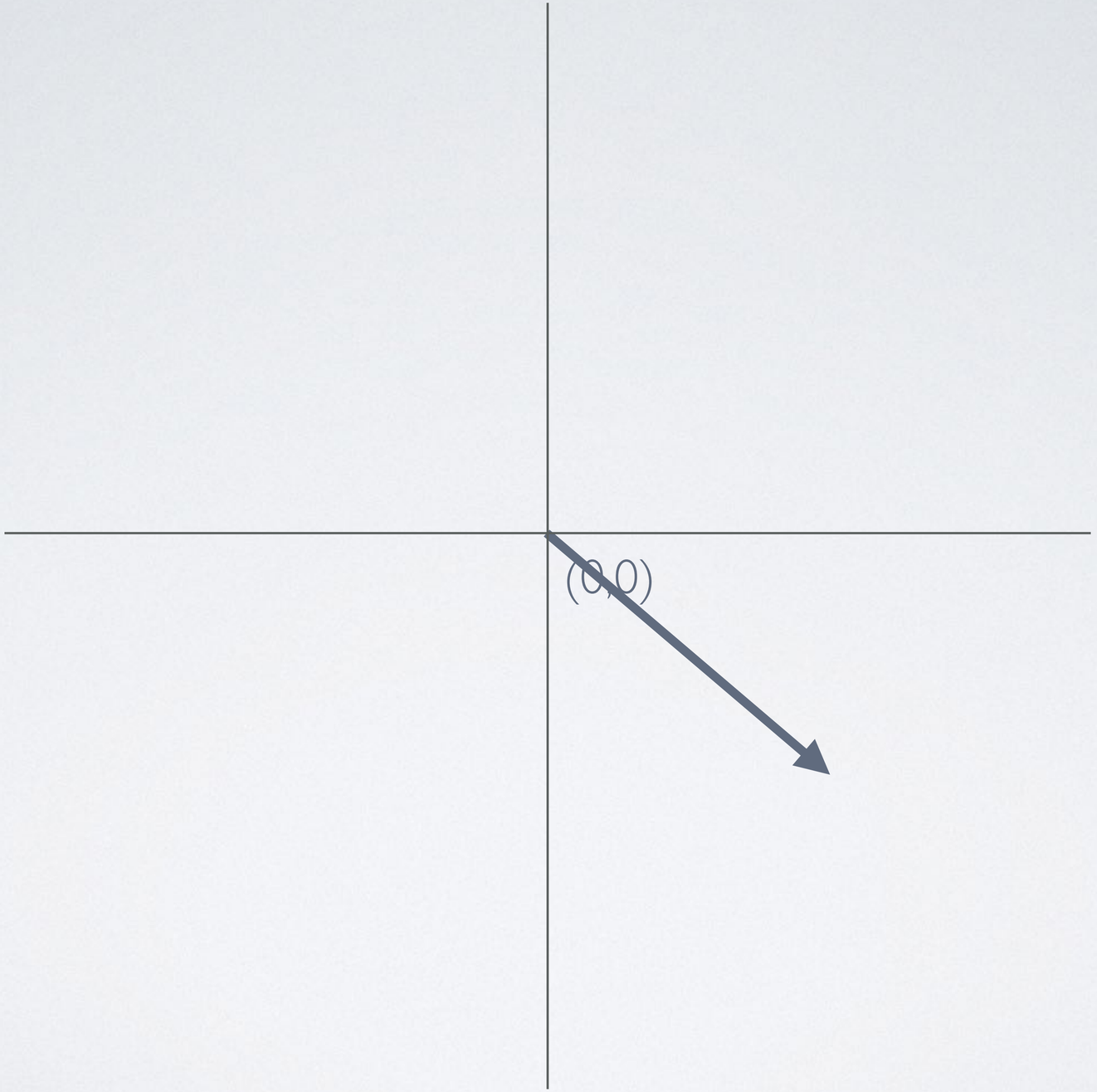
object

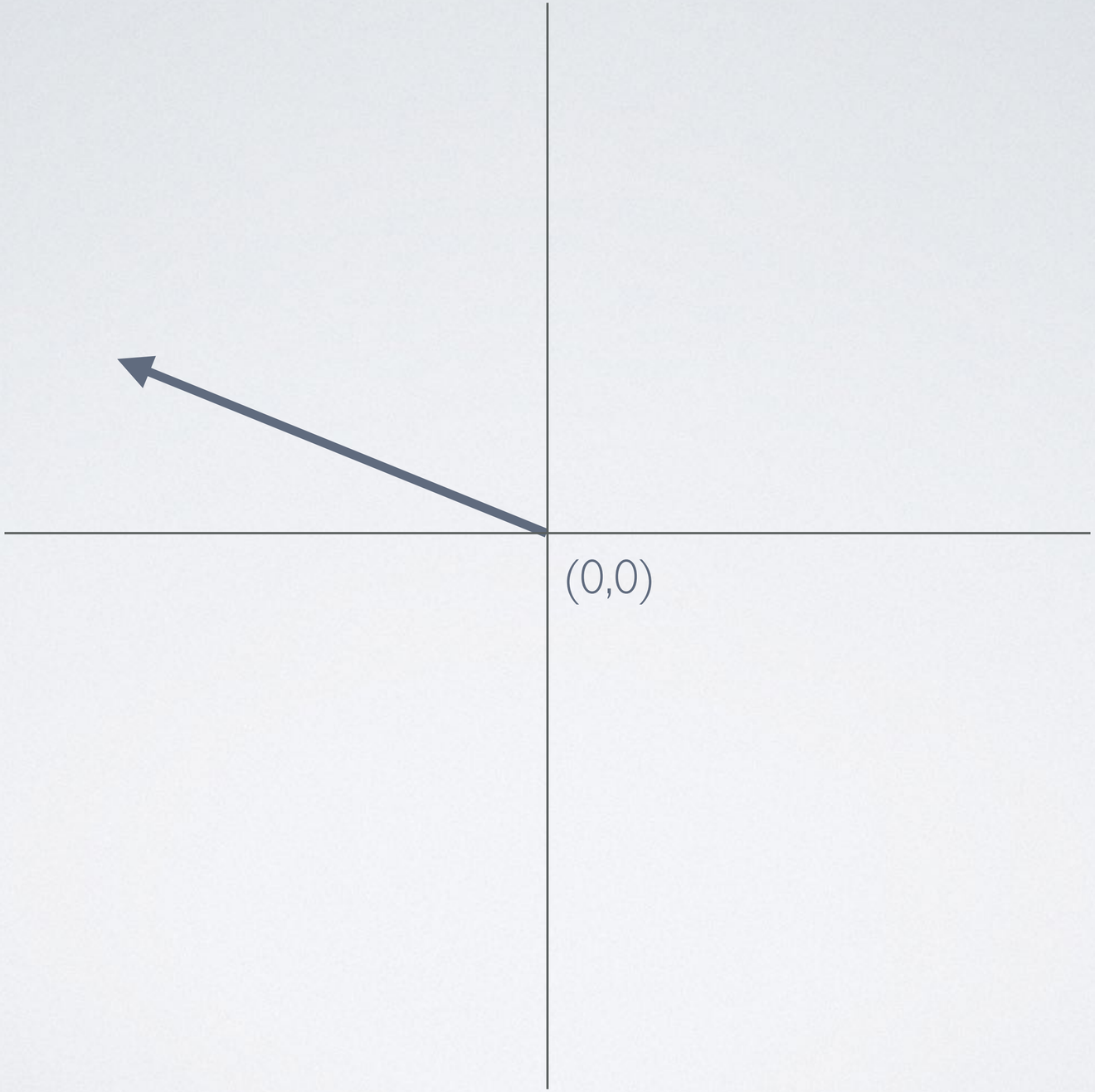
(x, y, z)

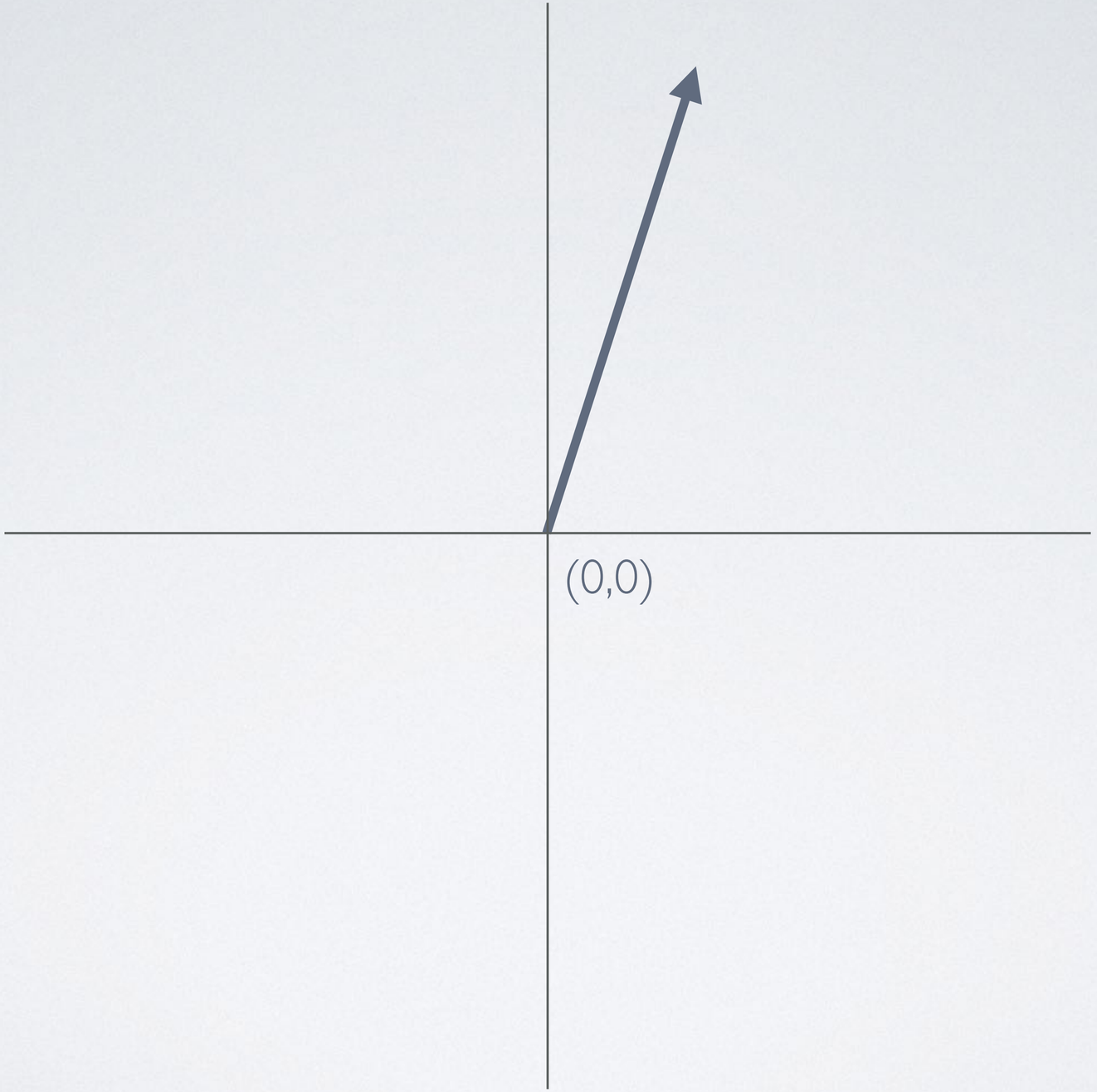

(0,0)
(x,y)

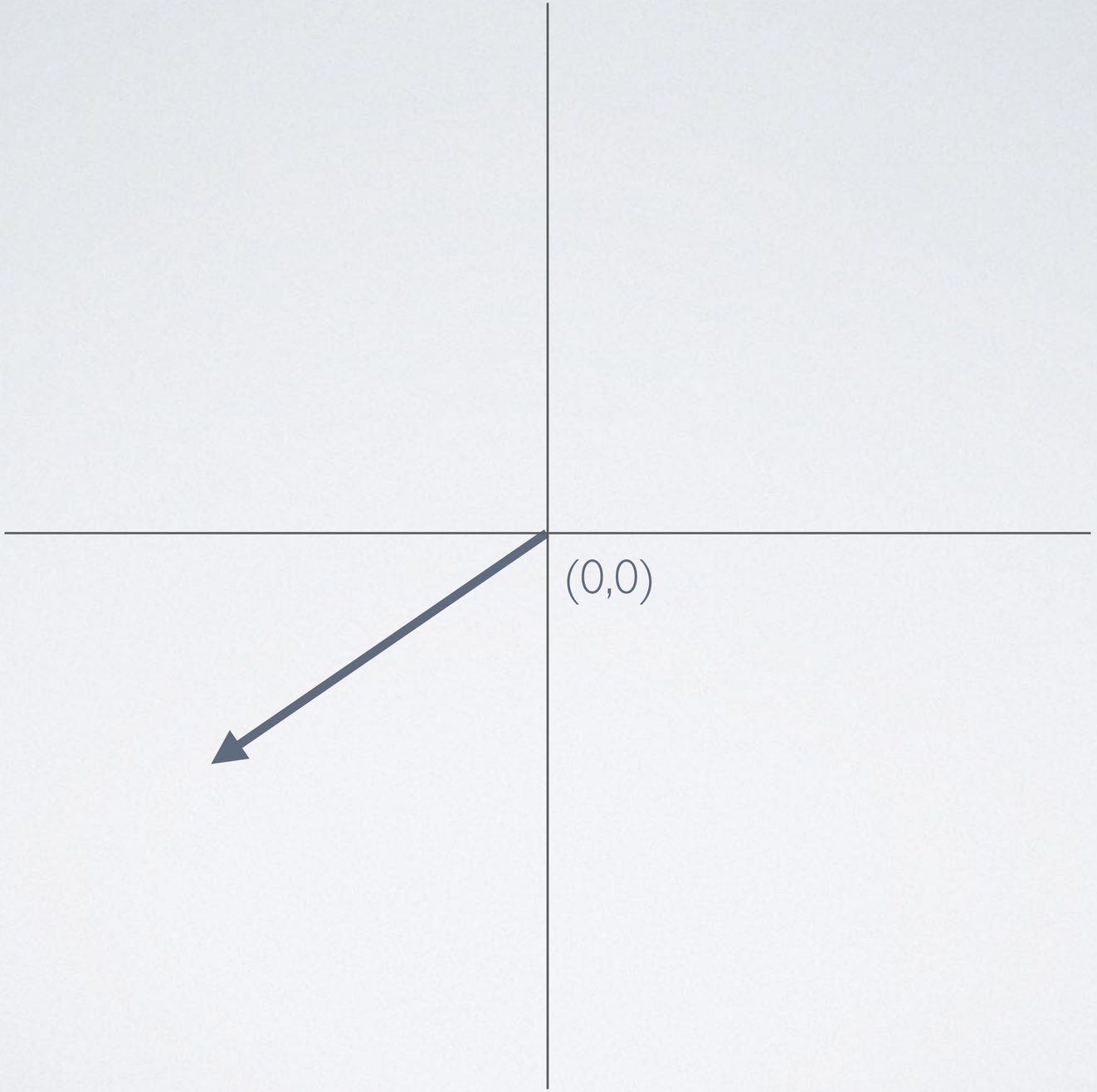

(0,0)
(x,y)
MAGNITUDE

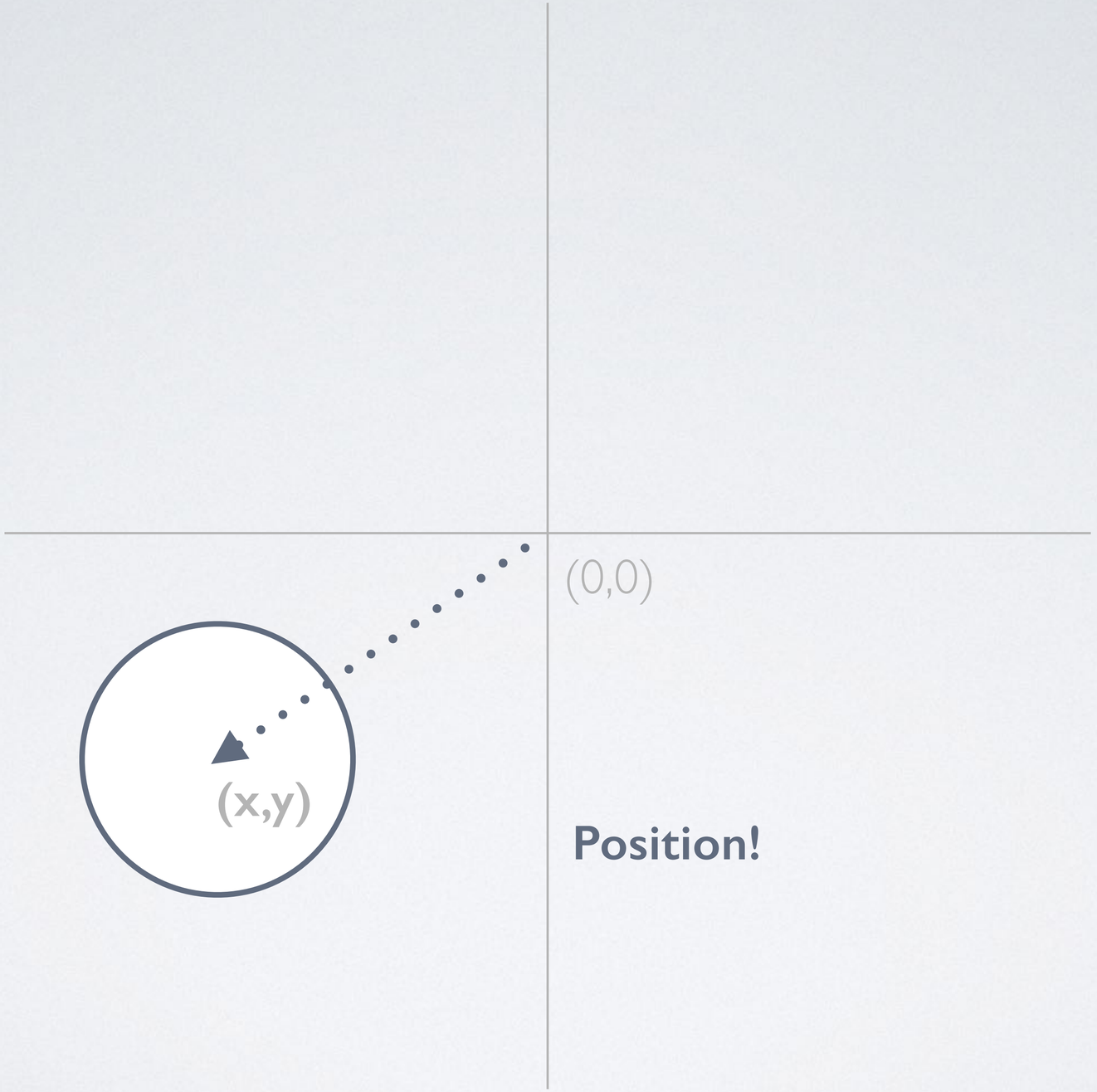

(0,0)
(x,y)
component
scalar
MAGNITUDE
Speed: Velocity, Acceleration


(0,0)

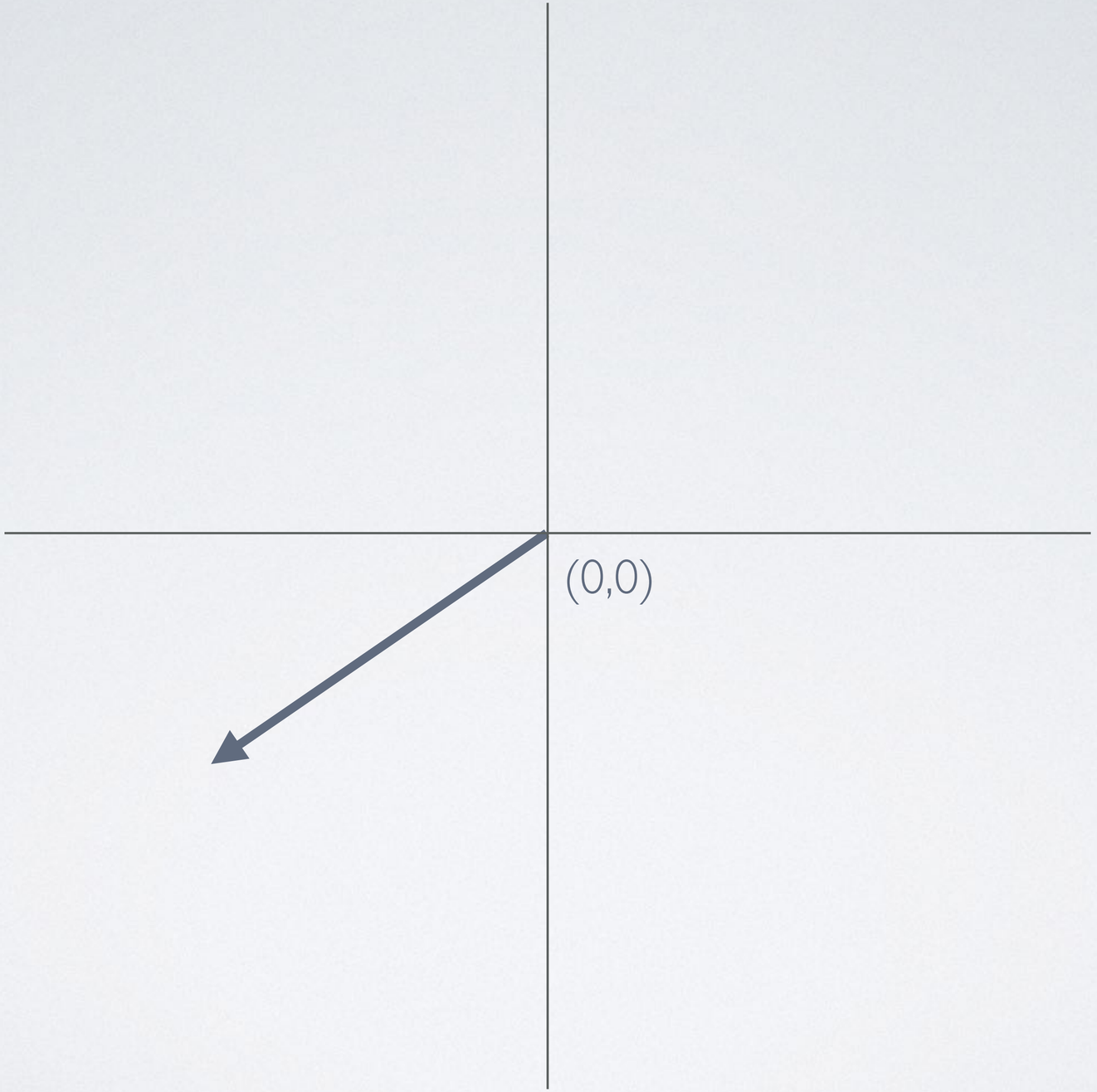

(0,0)

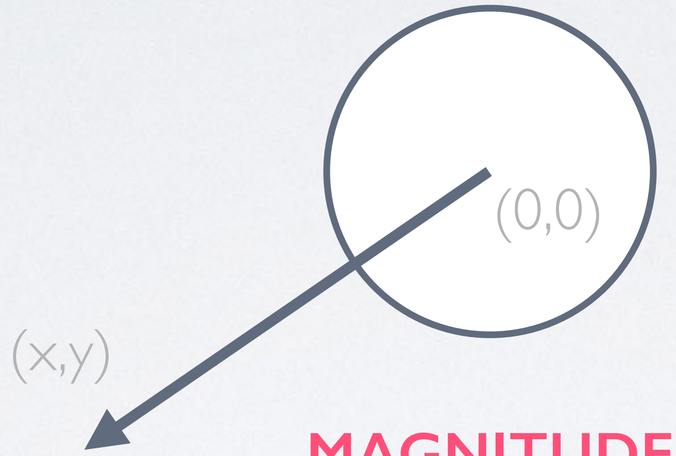

(0,0)


(0,0)



Position!


(0,0)



MAGNITUDE

Speed !

```
x = x + xspeed;
y = y + yspeed;
```

```
x = x + xspeed;
y = y + yspeed;
z = z + zspeed;
```

```
x = x + xspeed;
y = y + yspeed;
z = z + zspeed;
```

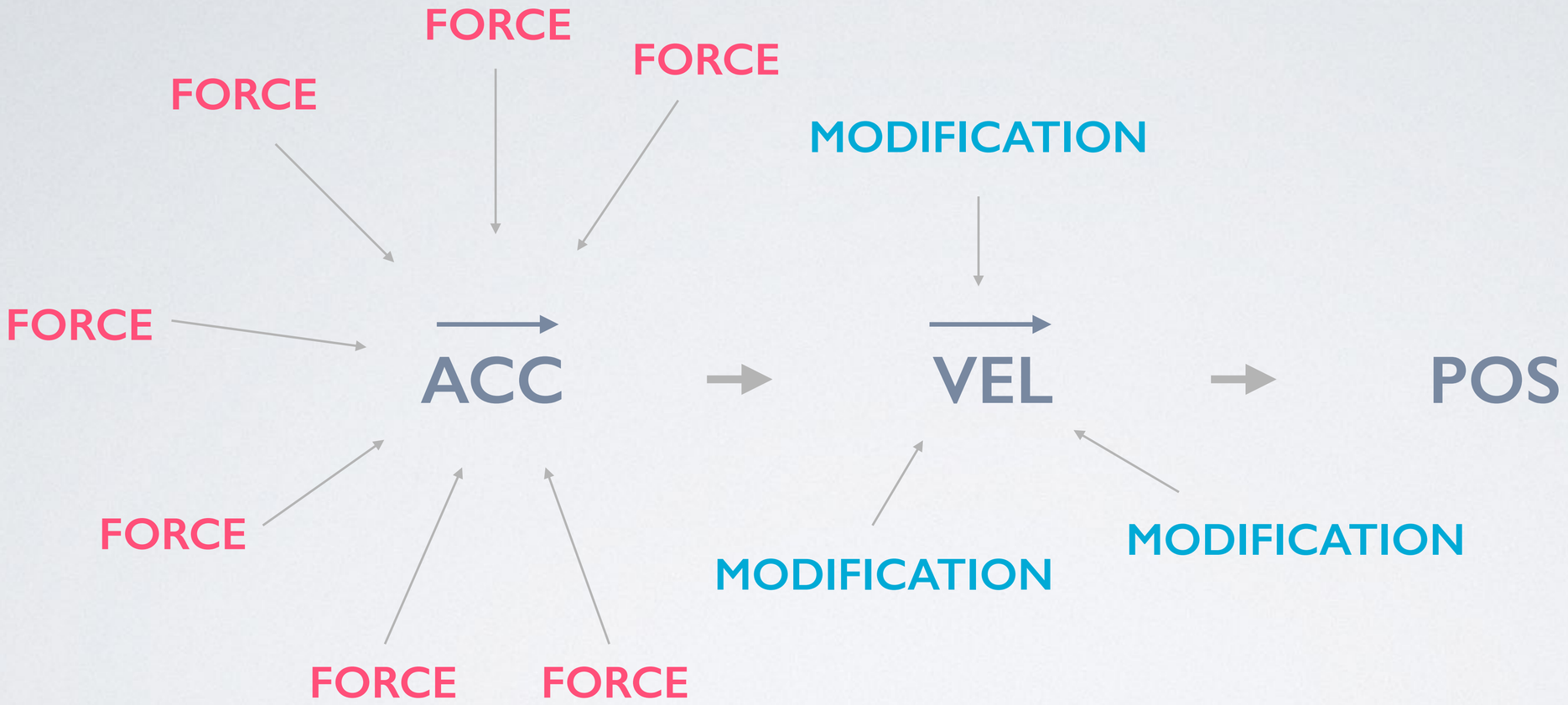
```
pos = pos + vel;
```

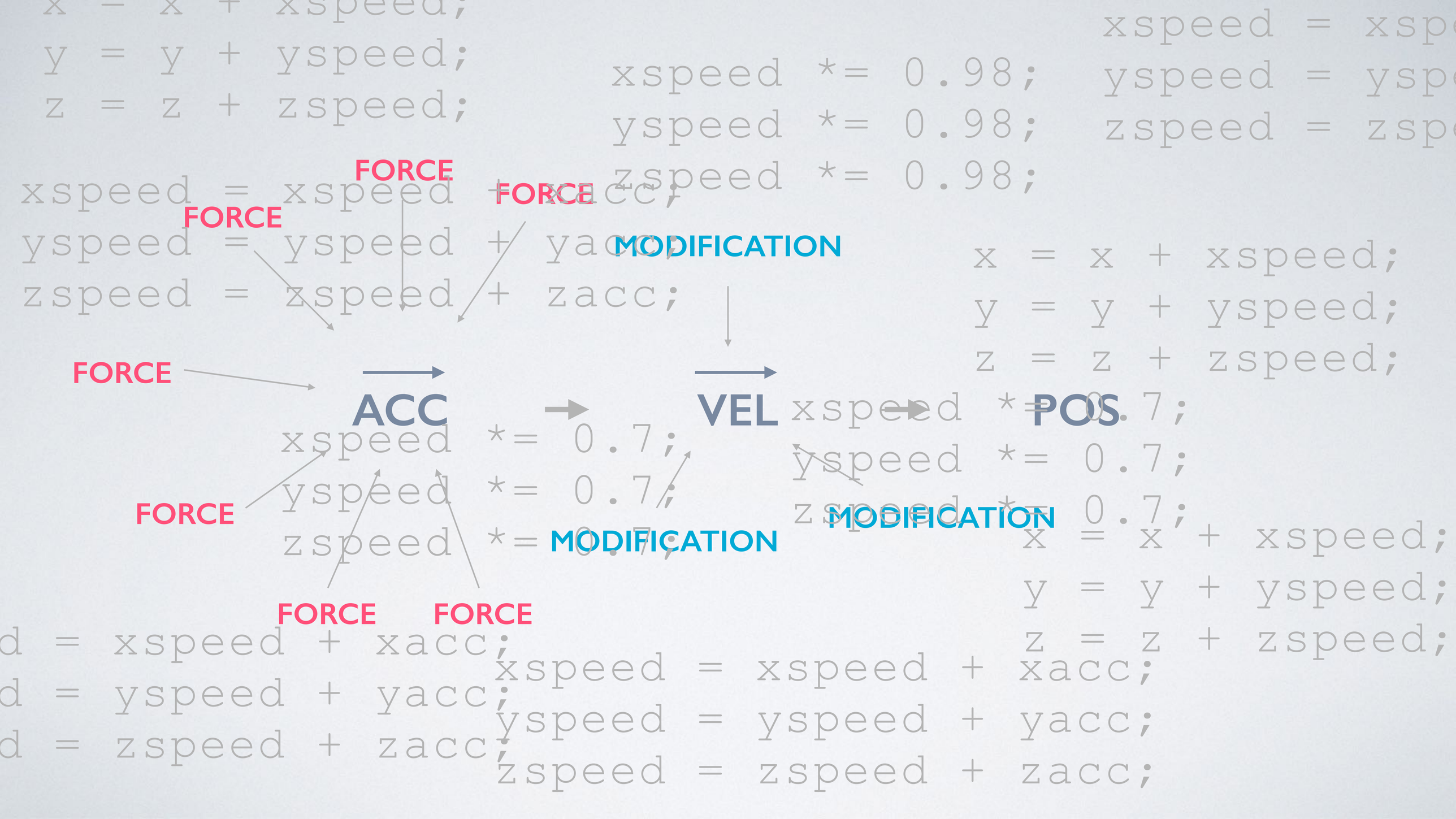
IN PHYSICS

$$\text{NEXT POSITION} = \text{CURRENT POSITION} + \overrightarrow{\text{VECTOR}}$$

IN PHYSICS

$\overrightarrow{ACC} \rightarrow \overrightarrow{VEL} \rightarrow POS$


FORCE
FORCE
FORCE
FORCE
FORCE
FORCE
FORCE
FORCE
MODIFICATION
MODIFICATION
MODIFICATION
ACC
VEL
POS

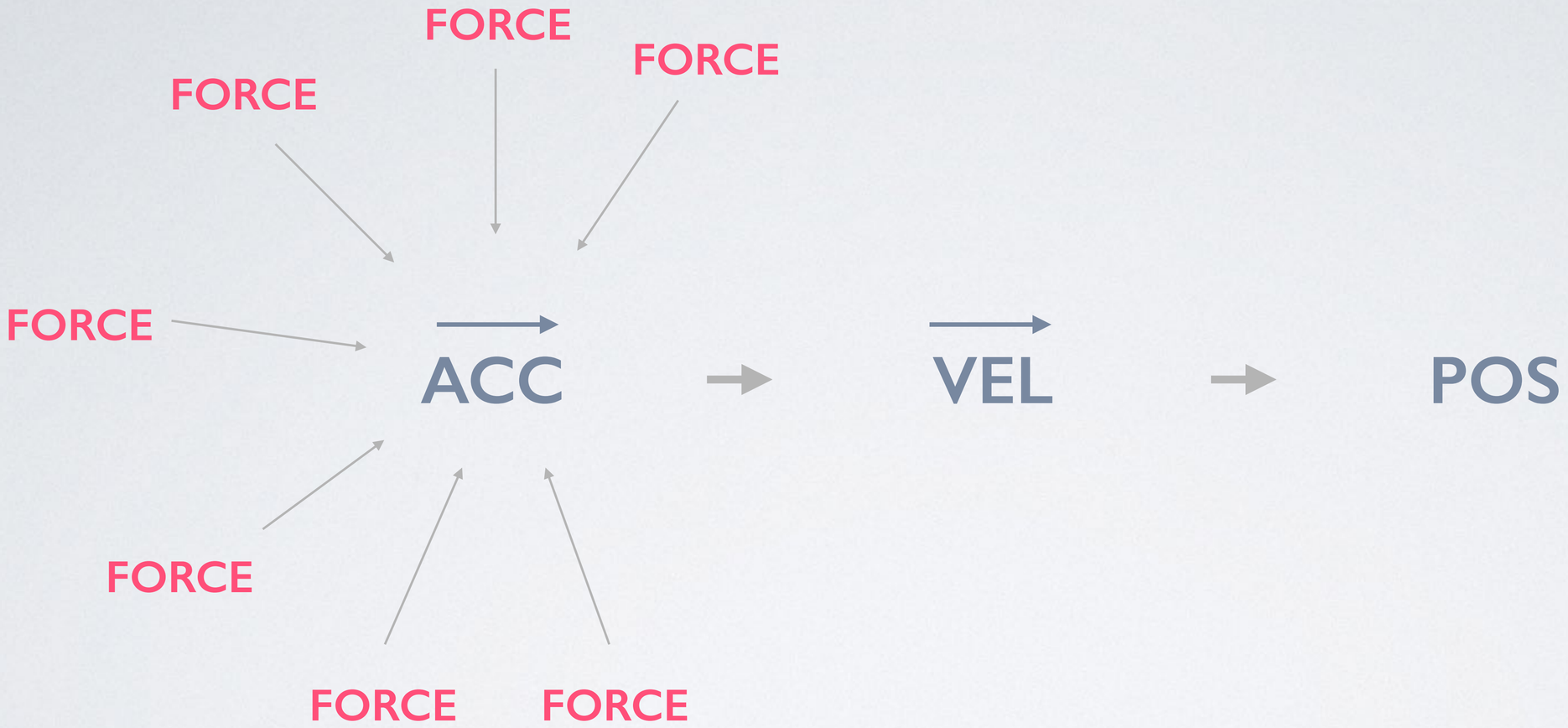

FORCE
FORCE
FORCE
FORCE
ACC
MODIFICATION
VEL
POS
FORCE
FORCE
MODIFICATION
MODIFICATION
FORCE
FORCE


ACC
VEL
POS

+ − * /

Unfortunately, we **cannot** use these operators…

VECTOR ADDITION


FORCE
FORCE
FORCE
FORCE
FORCE
FORCE
FORCE
ACC
VEL
POS

```
acc.add(force);
```

```
acc.add(force);
vel.add( acc );
pos.add( vel );
```

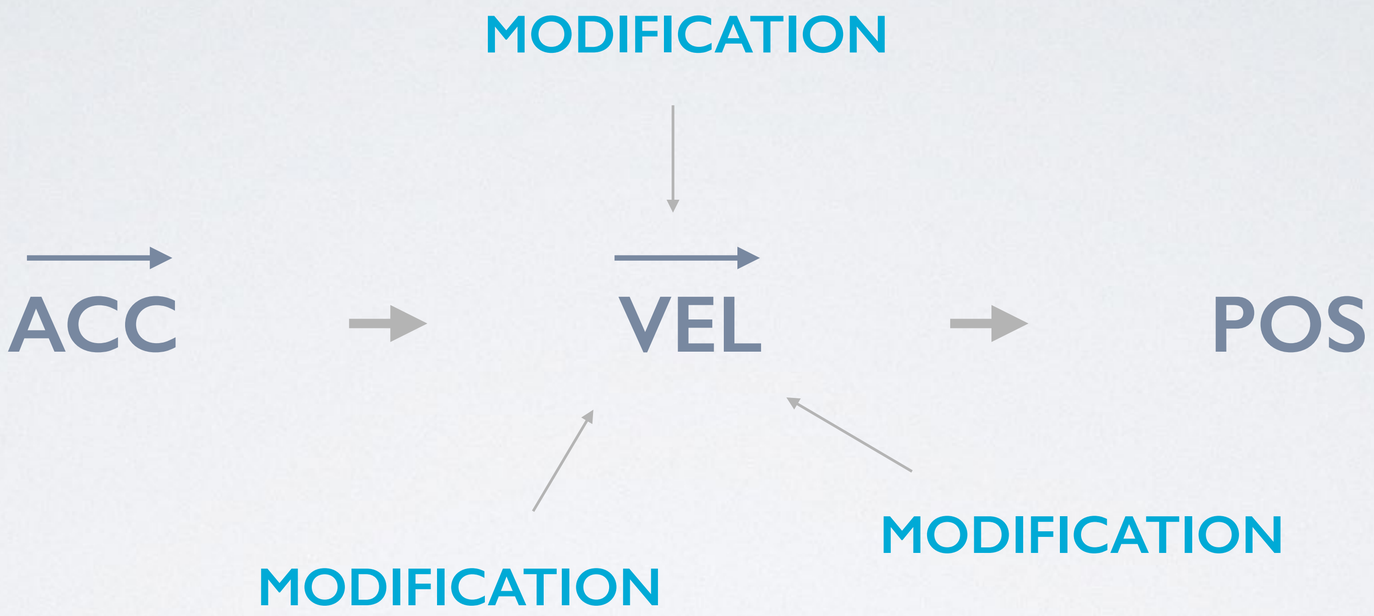
```
v1 = (6, 10)
     +
v2 = (3, -2)
     =
    (9, 8)
```

VECTOR SUBTRACTION


```
v2.sub(v1);
```

```
v1 = (6, 10)
      -
v2 = (3, -2)
      =
     (3, 12)
```

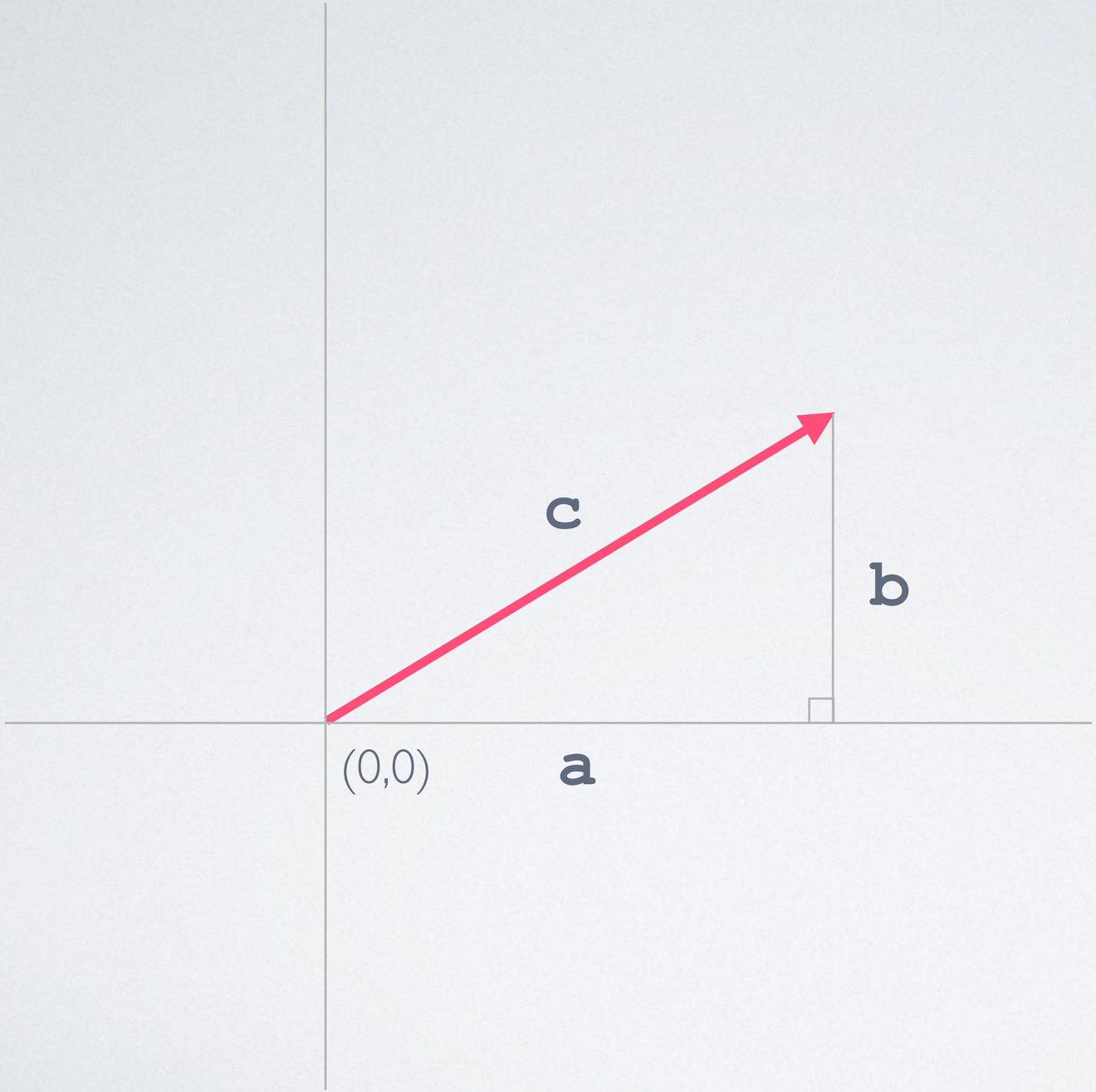
VECTOR MULTIPLICATION


MODIFICATION
ACC
VEL
POS
MODIFICATION
MODIFICATION

```
vel.mult(0.98);
```

```
vel = (6, 10)
      *
      3
      =
(18, 30)
```

VECTOR MAGNITUDE



MAGNITUDE

$$c^2 = a^2 + b^2$$

$$c = \sqrt{a^2 + b^2}$$

Pythagorean Theorem :D