

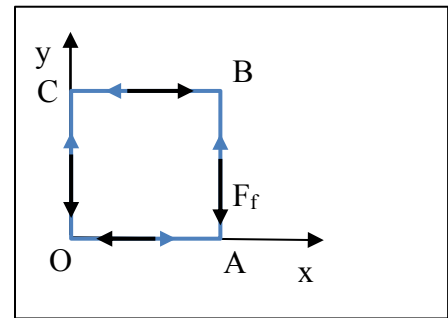
Exercise Friction is not conservative

- a) sketch: make two different paths in xy-direction:

path 1: $O=(0,0) \rightarrow C=(0,1)$

path 2: $O \rightarrow A=(1,0) \rightarrow B=(1,1) \rightarrow C$

The blue arrows indicate the direction of traveling; the black arrows the friction force on each piece of the paths.



- b) compute work done moving over path 1:

$$W_{OC} = \int_0^1 -\mu mg dy = -\mu mg$$

Compute work done moving over path 2:

$$W_{OABC} = \int_0^1 -\mu mg dx + \int_0^1 -\mu mg dy + \int_1^0 \mu mg dx = -3\mu mg$$

Clearly the work done for the two paths are not equal. Thus, this force is not conservative.