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Analytical Mechanics

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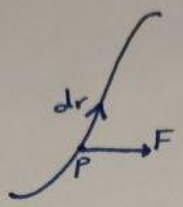
Lec.6: Conservation forces and force fields

4.4 Conservation Forces and Force Fields

Generally, the value of a line integral, the work in this case, depend on the path of integration see Fig



The work done by a force $\vec{F}$ is the line integral $\int \vec{F} \cdot d\vec{r}$

Many of physically important are conservative forces.

when F is a function of positional coordinates only is define <u>a static force field</u>

i.e $\int \vec{F} \cdot d\vec{r} \longrightarrow$ independent of Path integration

Mathematically for conservative field

$\vec{F} \cdot d\vec{r}$ is $\longrightarrow$ an exact differential

When a particle moves in a conservative field the work integral and hence the kinetic energy increment (الزيادة) can be known in advance. this knowledge can be use in predict the motion of the particle.