

**Vector Differential: Rectangular Coordinates:**

Find the general form for  $d\vec{r}$  in rectangular coordinates by determining  $d\vec{r}$  along the specific paths in the figure below.

- Path 1:

$$d\vec{r} =$$

- Path 2:

$$d\vec{r} =$$

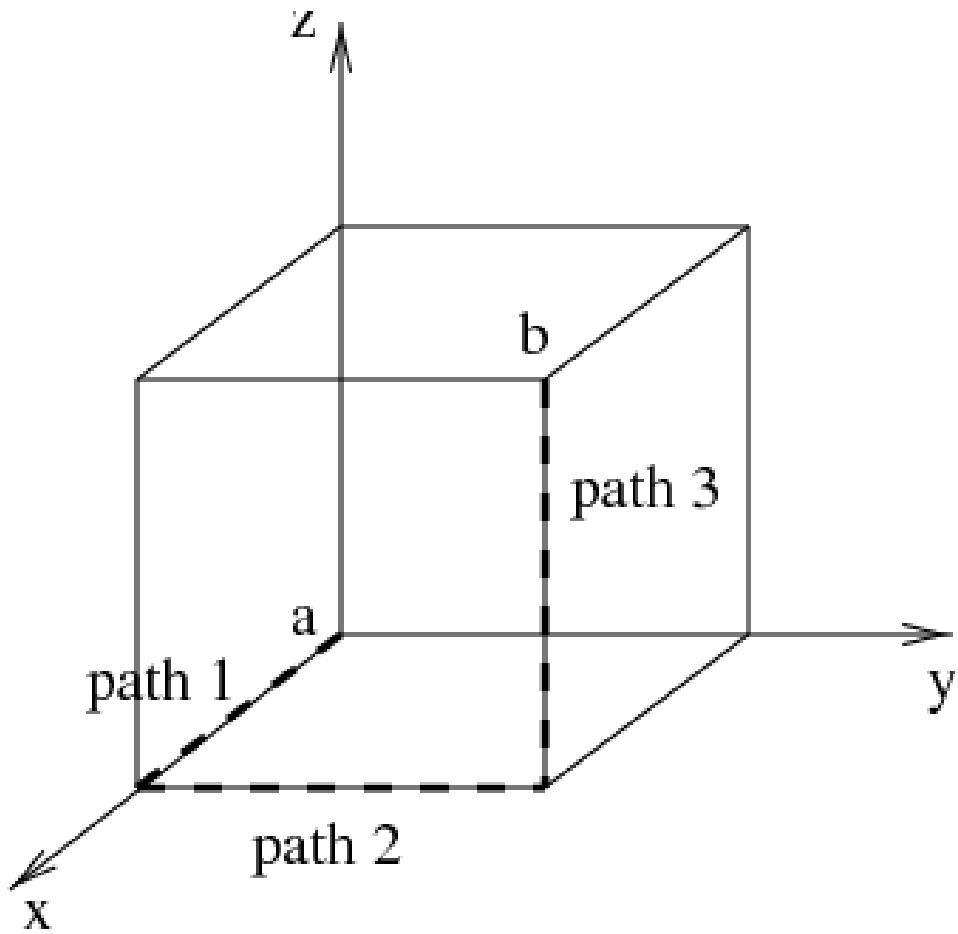
- Path 3:

$$d\vec{r} =$$

If all three coordinates are allowed to change simultaneously, by an infinitesimal amount, we could write this  $d\vec{r}$  for any path as:

$$d\vec{r} =$$

This is the general line element in rectangular coordinates.

Figure 1: Figure 1:  $d\vec{r}$  in rectangular coordinates