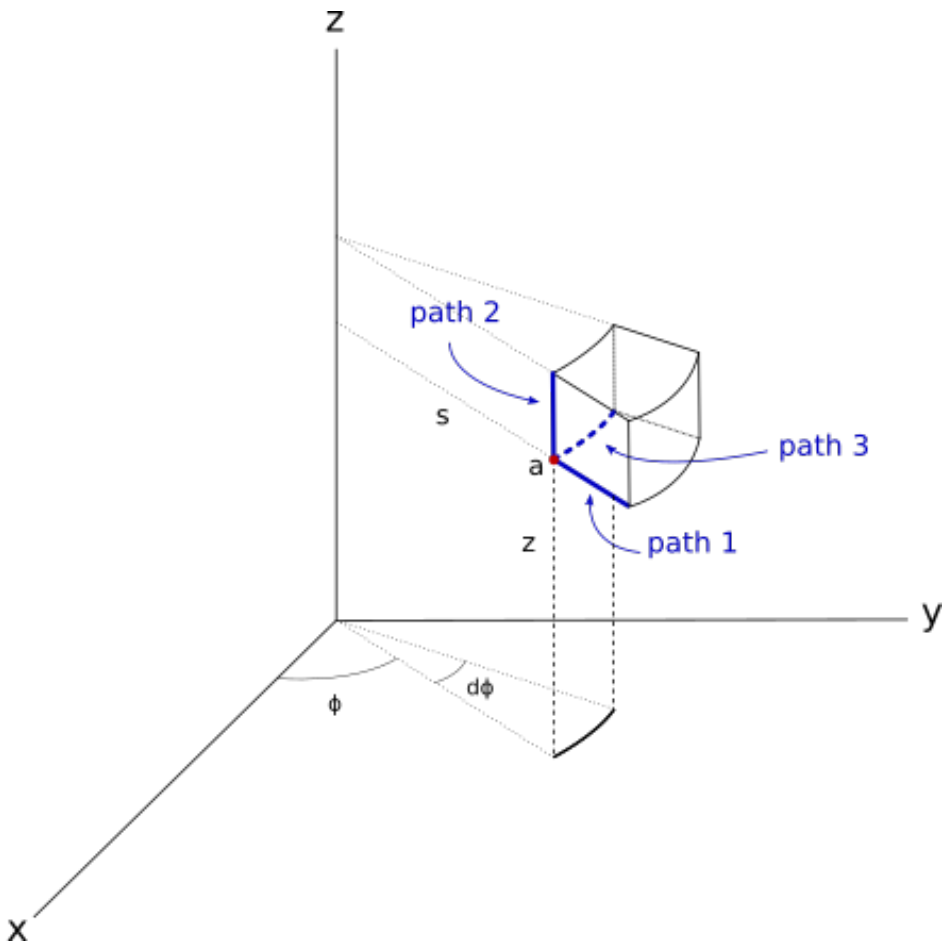
Cylindrical Coordinates:

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

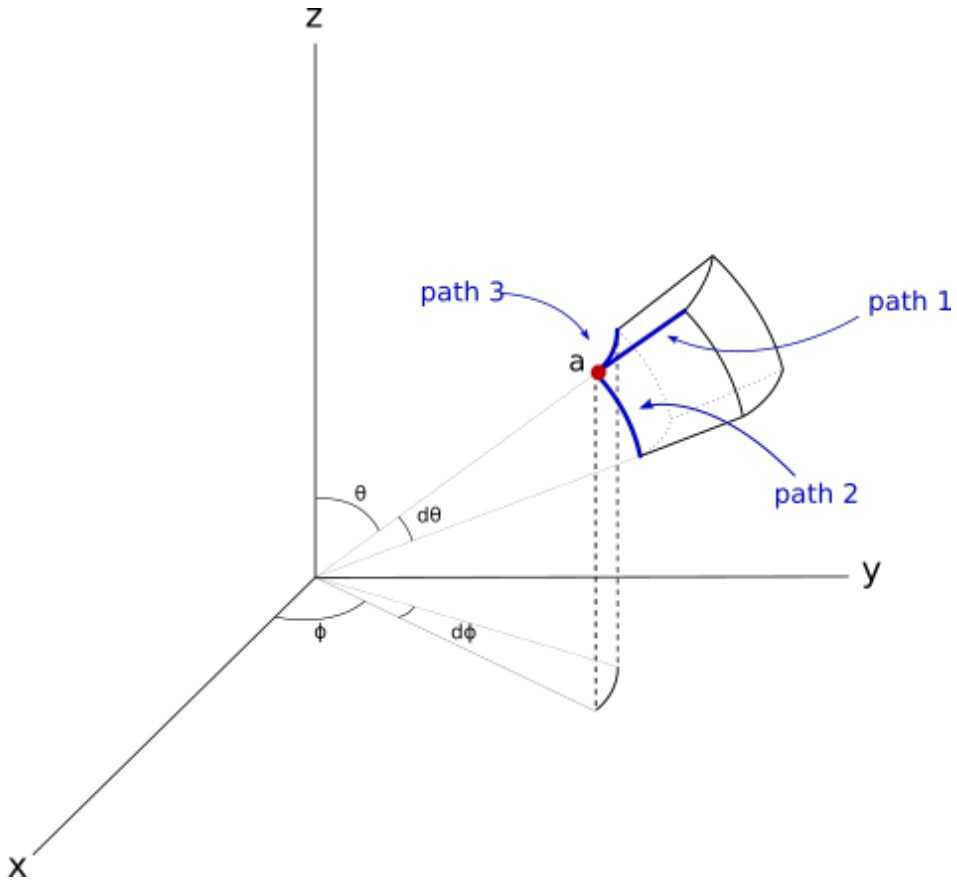
Spherical Coordinates:

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

Path 1: $d\vec{r} =$

Path 2: $d\vec{r} =$ (Be careful, this is the tricky one.)

Path 3: $d\vec{r} =$



If all 3 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 spherical coordinates.

by Corinne Manogue and Katherine Meyer