A cubic curve has the parametric equation:

If we restrict to , we can let the parametric equation define our curve if we set up for points to various different values.

For instance, if we set to and to . We are sure that the endpoints of the curve are correct. For a complete cubic curve definition, we need four points. The last two points we need we will define as the *derivative*at those end points instead.

We will define the *derivative* or to better call it the *speed* of the endpoints as and . We prefer the term *speed* as *derivative* lack direction.

|  |  |
| --- | --- |
|  |  |
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Note that we will be interested in equations for the , equally equivalent equations can be easily found on the .

Using and

By

By

By matrices we get:

|  |  |
| --- | --- |
| Easter egg by Ahmed |  |

The downside to the previous method is that and are not representative of a solid concept in a computer graphics setting, it would be better to define the curve using four points, instead of two points and two speeds.

We will start by renaming the starting point and the ending point to and respectively, and define two new points and

We will set the four points as key points when , , , and respectively.