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Description of Generic Path Following Algorithm:

1. Define the path to be followed as a parametric function. (F = where T is your parametric variable)
2. Place the object that will follow the path in its initial position P0 = (x, y, z) = (Fx(T0), Fy(T0), Fz(T0)).
3. Set the desired speed for the object.
4. Get the amount of time passed since last update of object’s position. (For a game, this will be the time interval between last call of main game loop and current call of main game loop, e.g., for 60 frames / sec, time would be approximately 1/60 = 0.0167 secs.)
5. Calculate desired distance object is to travel by multiplying speed \* time.
6. Create a new point on the path, P1, just slightly ahead of P0, by adding a small increment (delta T) to the initial value of your parametric variable and calling your parametric function, P1 = (Fx(T0 + delta T), Fy(T0 + delta T), Fz(T0 + delta T). (Unfortunately this is a bit confusing, because I used T for the parametric variable name. The delta T here is NOT the change in time, it’s just an arbitrarily small value selected to get a new point, P1).
7. Subtract P0 from P1 and place the result back into P1. P1 will then be a vector from P0 representing a tangent along your path (it will actually be a secant, but for small enough delta T they will be approximately the same).
8. Divide P1 by delta T, this gives you an approximation of F’(t) – the derivative of your parametric function.
9. Now we need to find the new value of the parametric variable, TNEW, to get the object to its new point, P2. The distance to be traveled (calculated in step 5) = TINCREMENT \* F’(t). So TINCREMENT = distance / F’(t).
10. Add TINCREMENT to T0 to get TNEW. (TNEW = T0 + TINCREMENT).
11. Feed TNEW into your parametric function to get the updated position for your object, P2 = (Fx( TNEW), Fy( TNEW), Fz( TNEW)).
12. Move object to P2. P2 then becomes P0 for the next iteration. Return to item 3 above until you no longer wish to keep moving the object.

P0

P1

P2

delta T

TNEW

path