

05.00A

Physical Problem of Interpolation General Engineering

Problem

To find the altitude, velocity and acceleration profile of a rocket, a velocity probe in the rocket (Figure 1) is measuring its velocity. Below are given some typical values of a rocket velocity profile are given in Table 1.



Figure 1 A rocket launched into space¹

¹ Source of rocket picture: NASA Langley Research Center, Office of Education, edu.larc.nasa.gov/pstp/

To determine the velocity at a particular time, one needs to interpolate the data. Although you may be familiar with linear interpolation, where you draw a straight line between two data points, you also want to know how accurate your estimate is. This forces you to use other interpolation functions such as quadratic and cubic polynomials.

Table 1. Velocity as a function of time

t (s)	$v(t)$ (m/s)
0	0
10	227.04
15	362.78
20	517.35
22.5	602.97
30	901.67

Can you also find the distance covered by the rocket from one point of time to the other? Can you find the acceleration of the rocket at a particular time?

INTERPOLATION

Topic	Physical problem for interpolation
Summary	Textbook notes of a problem for interpolation using real world physics data.
Major	General Engineering
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