

## 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 space<sup>1</sup>

<sup>1</sup> Source of rocket picture: NASA Langley Research Center, Office of Education, [edu.larc.nasa.gov/pstp/](http://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?

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**INTERPOLATION**

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Topic	Physical problem for interpolation
Summary	Textbook notes of a problem for interpolation using real world physics data.
Major	General Engineering
Authors	Autar Kaw
Last Revised	December 23, 2009
Web Site	<a href="http://numericalmethods.eng.usf.edu">http://numericalmethods.eng.usf.edu</a>

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