Multiple-Choice Test – Direct Method of Interpolation

Autar Kaw

1. A unique polynomial of degree _____ passes through $n+1$ data points.
   (A) $n+1$
   (B) $n+1$ or less
   (C) n
   (D) n or less

2. The following data of the velocity of a body is given as a function of time.

Time (s)	0	15	18	22	24
Velocity (m/s)	22	24	37	25	123

   The velocity in m/s at $16\,\text{s}$ using linear polynomial interpolation is most nearly

   (A) 27.867
   (B) 28.333
   (C) 30.429
   (D) 43.000

3. The following data of the velocity of a body is given as a function of time.

Time (s)	0	15	18	22	24
Velocity (m/s)	22	24	37	25	123

   The velocity in m/s at $16\,\text{s}$ using quadratic polynomial interpolation is most nearly

   (A) 27.867
   (B) 28.333
   (C) 30.429
   (D) 43.000

4. The following data of the velocity of a body is given as a function of time.

Time (s)	0	15	18	22	24
Velocity (m/s)	22	24	37	25	123

   Using quadratic interpolation, the interpolant

Source URL: http://numericalmethods.eng.usf.edu/
Saylor URL: http://www.saylor.org/courses/me205/

$$v(t) = 8.667t^2 - 349.67t + 3523, \quad 18 \le t \le 24$$

approximates the velocity of the body. From this information, the time in seconds at which the velocity of the body is 35 m/s during the above time interval of $t = 18\,\text{s}$ to $t = 24\,\text{s}$ is

(A) 18.667
(B) 20.850
(C) 22.200
(D) 22.294

5. The following data of the velocity of a body is given as a function of time.

Time (s)	0	15	18	22	24
Velocity (m/s)	22	24	37	25	123

One of the interpolant approximations for the velocity from the above data is given as

$$v(t) = 8.6667t^2 - 349.67t + 3523, \quad 18 \le t \le 24$$

Using the above interpolant, the distance in meters covered by the body between $t = 19\ \text{s}$ and $t = 22\ \text{s}$ is most nearly

(A) 10.337
(B) 88.500
(C) 93.000
(D) 168.00

6. The following data of the velocity of a body is given as a function of time.

Time (s)	0	15	18	22	24
Velocity (m/s)	22	24	37	25	123

If you were going to use quadratic interpolation to find the value of the velocity at $t = 14.9$ seconds, what three data points of time would you choose for interpolation?

(A) 0, 15, 18
(B) 15, 18, 22
(C) 0, 15, 22

(D) 0, 18, 24