

MATH 352 Syllabus and Exercises

Numerical Analysis, 9th Edition, Burden and Faires

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| Ch. 1 | Section 1.2 (Starting from Page 20) | Exercises: 1,2,3,5,10 |
| | Section 1.3 (Example 1 is not included) | Exercises: 6,7,13 |
| Ch. 2 | Section 2.1 (Proof of Theorem 2.1 is included) | Exercises: 1,3,4,5,10,11,12,16 |
| | Section 2.2 | Exercises: 1–5,10,11,13 |
| | Section 2.3 | Exercises: 1–6,10,14 |
| | Section 2.4 | Exercises: 1,2,4, 6, 10 |
| Ch. 3 | Section 3.1 | Exercises: 1,5,10,13 |
| | Section 3.3 (From the beginning until Page 129) | Exercises: 1,3,9 (a),10,17 |
| | Interpolation Using Linear Splines (From a reference book by Rizwan Butt and Heldermann Verlag) | <p>14. Which of the following functions are linear splines ?</p> $(a) \quad s(x) = \begin{cases} x, & 0 \leq x \leq 1 \\ 2x - 1, & 1 \leq x \leq 2 \\ x + 2, & 2 \leq x \leq 4 \end{cases} \quad (b) \quad s(x) = \begin{cases} 2 - x, & 0 \leq x \leq 1 \\ 2x - 1, & 1 \leq x \leq 2 \\ x + 1, & 2 \leq x \leq 4 \end{cases}$ <p>15. Find the linear spline which interpolates the data: $(0, 3.5), (1, 3.9), (2, 4.7), (3, 5.8)$ What are its values at $x = 0.55, 1.15$ and 2.5 ?</p> <p>16. Find the linear spline which interpolates the data: $(0, 0), (0.2, 0.18), (0.3, 0.26), (0.5, 0.41)$ What are its values at $x = 0.15, 0.25,$ and 0.45 ?</p> <p>17. Find the linear splines which interpolate the following data: $(0, 0), (1, 1), (16, 2), (81, 3)$ Compare interpolated values at $x = 0.5, 11.5,$ and 30.5 to $f(x) = \sqrt[4]{x}$.</p> <p>19. Find the linear splines which interpolate the following data: $(0, 1), (3, 2), (8, 3), (15, 4)$ Compare interpolated values at $x = 2.5, 5.5,$ and 10.5 to $f(x) = \sqrt{x + 1}$.</p> |

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| Ch. 4 | Section 4.1 (Round-off Error Instability is not included) | Exercises: 1,5,7,9,13,20 |
| | Section 4.3 | Exercises: 1,3,5,13, 15,17,19 |
| | Section 4.4 | Exercises: 1,3,8 (a,b),9,11(a,b) |
| Ch. 6 | Section 6.1 | Exercises: 1,5,9 |
| | Section 6.2 | Exercises: 1,5,9,11(a,c) |
| | Section 6.3 | Exercises: 5,8,9,10 |
| | Section 6.4 | Exercises: 1,5,7 |
| | Section 6.5 | Exercises: 1,3,5 |
| | Section 6.6 | Exercises: 1,3,5,11,16,18,20,23 |
| Ch. 7 | Section 7.1 (Proof of Theorem 7.7 is included) | Exercises: 1—5 |
| | Section 7.2 | Exercises: 1,5,7,9,11 |
| | Section 7.3 (Theorem 7.22 is not included) | Exercises: 1,3,5,7,10,13,14 |
| | Section 7.5 | Exercises: 1,2,3,7 |