

# Test B Geometric Modeling

Name:

IMPORTANT: You may have to make simple, reasonable assumptions to  $\vec{a}_i$  at an answer. State any such assumption.

Use the back of the previous page if more space is needed. does not explain the reasoning.

An answer 'yes' or 'no' is worth 0 points if it does not explain the reasoning. Write answers cleanly on the space provided. more space is needed.

## 1 B-spline form

- (5 points) Evaluate the spline with knot sequence  $t$  and control points  $c$ ,

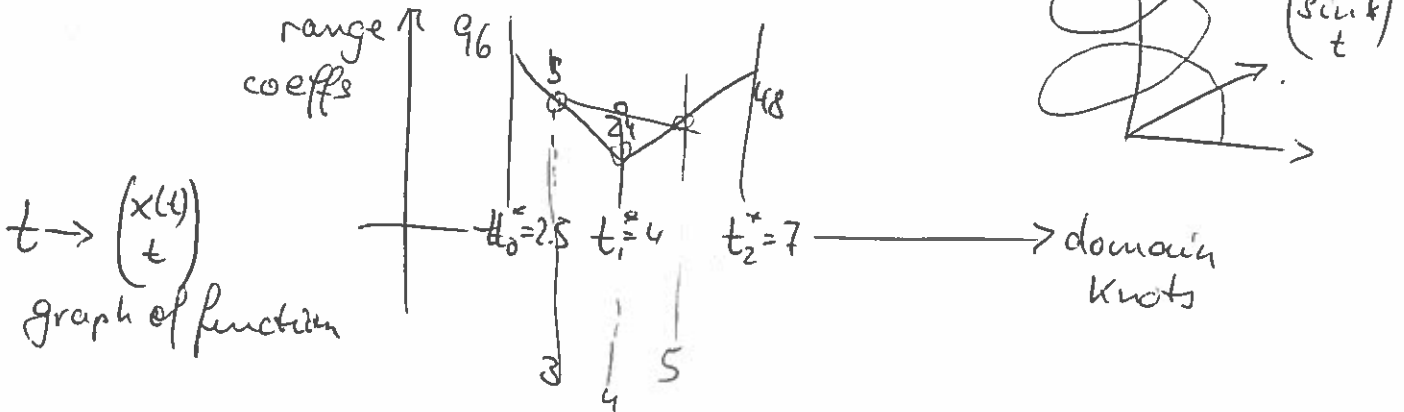
$$t := [1 \ 2 \ 3 \ 5 \ 9 \ 10], \quad c := [96 \ 21 \ 48],$$

at  $u = 4$ .

same as notes  $\times 2$  (shifted knots scaled coeffs)

- (3 points) Compute the Greville abscissae of the spline and draw the control polygon for each step of the evaluation above.

$$t_0^* = \frac{2+3}{2} \quad t_1^* = \frac{3+5}{2} \quad t_2^* = \frac{5+9}{2}$$



## 2 Geometric continuity

(2 points) Let  $l_1$  and  $l_2$  be two linear segments that join geometrically smooth at the origin. Let  $l_3$  and  $l_4$  be two linear segments that join geometrically smooth at the origin but a different change of variables (length ratio). Give an example (clean figure suffices) to show that  $l_1 + l_3$  and  $l_2 + l_4$  need not join geometrically smooth at the origin.

