Assignment 7

Coverage: 16.1 and part of 16.2 in Text.

Exercises: 16.1 no 12, 13, 15, 20, 21, 25, 26, 29, 34. 16.2 no. 11, 16, 20, 22, 24, 26.

Hand in 16.1 no 12, 20, 25; 16.2 no 11, 24, by March 21, 2023.

Supplementary Problems

1. Let f be a function on $[a, b]$. Verify that the parametric curve $x \mapsto x\mathbf{i} + f(x)\mathbf{j}$ is regular provided f is continuously differentiable on (a, b).

2. Let $\mathbf{c}$ be a regular parametric curve on $[a, b]$. Find a parametric curve γ whose image is the same as $\mathbf{c}$ but reverse the orientation.

3. Let $\mathbf{c}$ be a parametric curve from $[a, b]$ to C. Another parametric curve γ is called a reparametrization of $\mathbf{c}$ if $\gamma(t) = \mathbf{c}(\varphi(t))$ where φ is a continuously differentiable map from $[\alpha, \beta]$ one-to-one onto $[a, b]$. Show that

$$\int_a^b f(\mathbf{c}(t))|\mathbf{c}'(t)|\, dt = \int_\alpha^\beta f(\gamma(t))|\gamma'(t)|\, dt \ .$$