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### 0.1 Line integral of the complex plane

$$\begin{aligned}\int_C f(r)ds &= \lim_{\Delta s \rightarrow 0} \sum_{i=0}^n f(r(t_i))\Delta s_i \\ \int_C f(r)ds &= \lim_{\Delta s \rightarrow 0} \sum_{i=0}^n f(r(t_i))\frac{\delta r(t_i)}{\delta t}\delta r_i \\ \int_C f(z)dz &= \int_a^b f(r(t_i))\frac{\delta r(t_i)}{\delta t}\delta r_i\end{aligned}$$