535.641 Mathematical Methods Assignment 11 (Problems 41–44)

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41.

Integrate the following complex line integral in each of the following cases.

$$\int_C \mathrm{Re}\,(z)\,dz$$

(a) C is the straight line segment joining the initial point 0 to the end point $2 + 2i$.

(b) C consists of the two straight line segments: the first connecting 0 to 2 and the second connecting 2 to $2 + 2i$.

42.

Evaluate each complex line integral without using the parametrization of the curve method.

(a) $\displaystyle\int_C \frac{dz}{2z-i}$, where C is the circle $|z| = 4$.

(b) $\displaystyle\int_C \frac{dz}{z^2-1}$, where C is the circle $|z| = 4$.

43.

Evaluate each complex line integral without using the parametrization of the curve method.

(a) $\displaystyle\int_C \frac{z^2-1}{z^2+1}dz$, where C is the circle $|z+i|=1$.

(b) $\displaystyle\int_C z\cos\left(z^2\right)dz$, where C is the line segment joining 0 to $1+i$.

(c) $\displaystyle\int_C \frac{\sin(2z)}{(z-1)^4}dz$, where C is any simple closed curve enclosing 1.

44.

Evaluate each complex line integral without using the parametrization of the curve method.

(a) $\displaystyle\int_C \frac{\cos(3z)}{(2z-1)^2}dz$, where C is the circle $|z-1/2|=1$.

(b) $\displaystyle\int_C \frac{e^z\cos(z)}{(z-1)^2}dz$, where C is any simple closed curve enclosing 1.

(c) $\displaystyle\int_C \frac{(1+z)\cos(z)}{(2z-1)^2}dz$, where C is any simple closed curve enclosing $1/2$.