

Tutorial 5 Conformal mapping and bilinear transformation

- Q.1** Under the transformation $w = iz + i$, Find the image of half-plane $x > 0$, in z-plane on w-plane. **Ans** $v > 1$
- Q.2** Find the image of the region $y > 1$, under the transformation $w = (1 - i)z$.
- Q.3** Find the image of the infinite strip $0 < y < \frac{1}{2c}$, under the transformation $w = \frac{1}{z}$. **Ans** $u^2 + (v+c)^2 > c^2, v < 0$
- Q.4** Find the image of the quadrant $x > 1, y > 0$, under the transformation $w = \frac{1}{z}$. **Ans** $|w - \frac{1}{2}| < \frac{1}{2}, v < 0$
- Q.5** Find the image of the hyperbola $x^2 - y^2 = 1$, Under the transformation $w = \frac{1}{z}$. **Ans** $R^2 = \cos 2x$
- Q.6** Find the bilinear transformation which maps the points $z = 0, -i, -1$ into $w = i, 1, 0$ respectively. **Ans**
 $w = i \frac{1+z}{1-z}$
- Q.7** Find the fixed point for the following transformation.
(1) $w = z$, (2) $w = 3z - 2$, (3) $w = 2z + 3$, (4) $w = \frac{3z-4}{z-1}$
- Q.8** Find the bilinear transformation which maps the points $i, -i, 1$, of the z-plane into $0, 1, \infty$, respectively.
- Q.9** Define the Conformal mapping and give me one example.
- Q.10** Let a rectangular domain R be bounded by $x = 0, y = 0, x = 2, y = 1$, determine the region R_1 in w-plane in which R is mapping under the transformation $f(z) = z + (1 - 2i)$
- Q.11** Define the Bilinear Transformation with one example.