

## Series 9

### I. Integration contours

Pull the figure of the integration contours for (3.53) on the  $z$ -plane back to the cylinder and draw them on the cylinder as equal-time contours.

### II. Sort-distance singularities of $T_{zz}$ , $T_{\bar{z}\bar{z}}$ with $\Phi$

Derive (3.56) from (3.55) using residues.

### III. The Schwartzian derivative

Calculate the Schwartzian derivative  $S(f, z)$  for  $f(z) = \frac{az+b}{cz+d}$  with  $ad - bc = 1$ .