

Expand the function $f(z) = \frac{z^2 - 2z + 2}{z - 2}$ in a Laurent series which converges in the given annular domain $1 < |z - 1|$. [104 清大核工工科 8]

$$\begin{aligned} \text{[解]} f(z) &= \frac{(z-1)(z-2) + (z-2) + 2}{(z-1) - 1} = (z-1) + 1 + \frac{2}{(z-1) - 1} = (z-1) + 1 + \frac{2}{1 - \frac{1}{z-1}} \\ &= (z-1) + 1 + \frac{2}{z-1} \left[1 + \frac{1}{z-1} + \left(\frac{1}{z-1}\right)^2 + \left(\frac{1}{z-1}\right)^3 + \cdots \right] \end{aligned}$$

Southern Taiwan University of Science and Technology