

## Análise Complexa e Equações Diferenciais

### Respostas à Ficha de Trabalho 6

1.  $\frac{T(1+\frac{r}{100})^{\frac{N}{12}}(1-(1+\frac{r}{100})^{\frac{1}{12}})}{1-(1+\frac{r}{100})^{\frac{1}{12}}}$ .
2. (i) Sim; (ii) Sim; (iii) Não; (iv) Sim;  
(v) Não; (vi) Sim; (vii) Sim; (viii) Sim.
3. (i)  $|z + 1| < 2$ ; (ii)  $\operatorname{Re}(z) > 0$ ; (iii)  $|z| = 1$ .
4. (i) 1; (ii) 1; (iii) 1; (iv)  $+\infty$ ; (v) 0.
5. a)  $R^5$ ; b)  $\sqrt{R}$ .
6. (i)  $\sum_{n=0}^{\infty} \frac{(-2)^n}{5^{n+1}} z^n$ ,  $|z| < \frac{5}{2}$ ;  
(ii)  $\sum_{n=0}^{\infty} (-1)^n z^{4n}$ ,  $|z| < 1$ ;  
(iii)  $\sum_{n=0}^{\infty} \frac{(-1)^n}{n!} z^{2n}$ ,  $z \in \mathbb{C}$ ;  
(iv)  $\sum_{n=1}^{\infty} (-1)^{n+1} n z^{n+1}$ ,  $|z| < 1$ ;  
(v)  $\sum_{n=0}^{\infty} \frac{(-1)^n}{3^{2n+1}(2n+1)!} z^{4n+2}$ ,  $z \in \mathbb{C}$ ;  
(vi)  $1 + \sum_{n=1}^{\infty} \frac{(-1)^{n+1}(n-1)}{n!} z^n$ ,  $z \in \mathbb{C}$ ;  
(vii)  $-2 + \sum_{n=1}^{\infty} \frac{7(-1)^{n+1}}{2^n} z^n$ ,  $|z| < 2$ ;  
(viii)  $\sum_{n=0}^{\infty} \frac{1}{4} \left( (-1)^{n+1} - \frac{1}{3^{n+1}} \right) z^n$ ,  $|z| < 1$ ;  
(ix)  $\sum_{n=1}^{\infty} n z^{3n-3}$ ,  $|z| < 1$ .
7. (i)  $\sum_{n=0}^{\infty} i^{-n-1} (z - 1 + i)^n$ ,  $|z - 1 + i| < 1$ ;  
(ii)  $\sum_{n=0}^{\infty} \frac{(-1)^n}{2} \left( \frac{1}{i^{n+1}} - \frac{1}{(2+i)^{n+1}} \right) (z - i)^n$ ,  $|z - i| < 1$ ;  
(iii)  $\sum_{n=0}^{\infty} (-1)^n \left( \frac{1}{2^{n+1}} + n \right) (z - 2)^n$ ,  $|z - 2| < 1$ ;  
(iv)  $\sum_{n=0}^{\infty} \frac{(-1)^{n+1}}{(2n)!} (z + 1)^{2n} + \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)!} (z + 1)^{2n+1}$ ,  $z \in \mathbb{C}$ ;  
(v)  $\sum_{n=0}^{\infty} \frac{(-1)^n}{n+1} (z + 1)^{2n+2}$ ,  $|z + 1| < 1$ .
8. O raio de convergência é  $\pi - 2$ .