Instituto Superior Técnico
Departamento de Matemática

Análise Complexa e Equações Diferenciais

Respostas à Ficha de Trabalho 14

1. (i) $\frac{s}{s^2-a^2}$; (ii) $\frac{2as}{(s^2+a^2)^2}$; (iii) $\frac{s-a}{(s-a)^2+b^2}$; (iv) $\frac{\pi}{2} - \arctan s$.

2. (i) $\frac{t}{2}\operatorname{ch} t - \frac{1}{2}\operatorname{sh} t$; (ii) $\frac{3}{4}\sin t - \frac{1}{4}\operatorname{sen} 3t$; (iii) $\frac{3}{5}e^{2t} + \frac{2}{5}e^{-3t}$; (iv) $\frac{t^3}{6}e^{-t}$.

3. (i) $\frac{1}{5}e^{3t} + \frac{4}{5}e^{-2t}$;

(ii) $e^t - te^t + \frac{1}{6}t^3e^t$;

(iii) $e^{-t}\operatorname{sen} t + \frac{H(t-\pi)}{2}\big(1 + e^{t-\pi}(\cos t + \operatorname{sen} t)\big) - \frac{H(t-2\pi)}{2}\big(1 - e^{t-2\pi}(\cos t + \operatorname{sen} t)\big)$;

(iv) $e^{-t}\big(\cos t + \sin t\big) - H(t-\pi)e^{\pi-t}\sin t$;

(v) $-\big(H(t-\pi) + H(t-2\pi)\big)\sin t$;

(vi) $1+\frac{1}{4}e^t-\frac{1}{4}e^{-t}-\frac{1}{2}\operatorname{sen} t+H(t-\pi)\left(\frac{1}{4}e^{t-\pi} - \frac{1}{4}e^{\pi-t} + \frac{1}{2}\operatorname{sen} t\right)+H(t-2\pi)\left(-1 + \frac{1}{2}e^{t-2\pi} + \frac{1}{2}e^{2\pi-t}\right)$.

4. (b) $\frac{1}{2}\operatorname{sen} t + \frac{1}{2}t\cos t$.