TL31: Entornos matematicos

Jesus Adrian Rosas Martinez

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\begin{aligned}
h_{w_H}(\delta) &= \min_{z\in(0,1]} \log_q \frac{f_{w_H}(z)}{z^\delta} \\
&= \min_{z\in(0,1]} \left(\log_q f_{w_H}(z) - \log_q z^\delta\right) \\
&= \min_{z\in(0,1]} \left(\log_q \left(1+(q-1)z\right) - \delta \log_q z\right) \\
&= \log_q \left(1+(q-1)\frac{\delta}{(q-1)(1-\delta)}\right) - \delta \log_q \left(\frac{\delta}{(q-1)(1-\delta)}\right) \\
&= \log_q \left(\frac{1}{1-\delta}\right) - \delta \log_q \delta + \delta \log_q (q-1) + \delta \log_q (q-1) \\
&= \delta \log_q \frac{1}{\delta} + (1-\delta) \log_q \frac{1}{1-\delta} + \delta \log_q (q-1).
\end{aligned}
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\begin{aligned}
ab &= [x_1,x_2]qx_2[x_1,x_2][x_1,x_2]x_1 + q^{-1}qx_2[x_1,x_2]\left[[x_1,x_2] + q^{-1}x_2x_1\right][x_1,x_2]x_1 \\
&= [x_1,x_2]qx_2[x_1,x_2][x_1,x_2]x_1 + x_2[x_1,x_2][x_1,x_2][x_1,x_2]x_1 \\
&\quad + x_2[x_1,x_2]q^{-1}x_2x_1[x_1,x_2]x_1.
\end{aligned}
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\begin{aligned}
[x_i,x_j] &= 0, \quad si\ |i-j|>1; && (1)\\
[[x_i,x_{i+1}],x_{i+1}] &= 0, \quad si\ 1\le i<n; && (2)\\
[x_i,[x_i,x_{i+1}]] &= 0, \quad si\ 1\le i<n. && (3)
\end{aligned}
$$

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[x_i,x_j] &= 0, \quad si\ |i-j|>1; \\
[[x_i,x_{i+1}],x_{i+1}] &= 0, \quad si\ 1\le i<n; \\
[x_i,[x_i,x_{i+1}]] &= 0, \quad si\ 1\le i<n. && (4)
\end{aligned}
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\begin{aligned}
e^{i\theta_1}e^{i\theta_2} &= (\cos\theta_1 + i\,\mathrm{sen}\,\theta_1)(\cos\theta_2 + i\,\mathrm{sen}\,\theta_2) \\
&= (\cos\theta_1\cos\theta_2 - \mathrm{sen}\,\theta_1\,\mathrm{sen}\,\theta_2) + i(\cos\theta_1\,\mathrm{sen}\,\theta_2 + \mathrm{sen}\,\theta_1\cos\theta_2) \\
&= \cos(\theta_1+\theta_2) + i\,\mathrm{sen}\,(\theta_1+\theta_2) \\
&= e^{i(\theta_1+\theta_2)}.
\end{aligned}
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