$$
\begin{aligned}
-|\log(\underline{\underline{\Theta}})| &\approx \frac{1}{\ell^*} \sum_v \sum_{j=1}^{\ell^*} \left(j \cdot \mathfrak{d}(\mathrm{P})_v - j^2 \frac{1}{2\ell[\mathrm{K}:\mathbf{Q}]} v(q_v) \log(\mathrm{N}(v)) \right) \\
&= \frac{1}{\ell^*} \cdot \frac{\ell^*(\ell^*+1)}{2} \mathfrak{d}(\mathrm{P}) - \frac{1}{\ell^*} \cdot \frac{\ell^*(\ell^*+1)(2\ell^*+1)}{12\ell} \deg(q_{\mathrm{E}}) \\
&= \frac{\ell^*+1}{2} \left(\mathfrak{d}(\mathrm{P}) - \frac{1}{6} \deg(q_{\mathrm{E}}) \right)
\end{aligned}
$$