Some entropy inequalities

Consider the \((IC, H)\)-diagram consisting of all points \((IC(P), H(P))\) where \(IC = \sum p_i^2\), \(H = -\sum p_i \ln p_i\):

Let \(Q_k = \left(\frac{1}{k}, \ln k\right)\). Then \(Q_k \in \Delta\) for all \(k \geq 1\) and the \(Q_k\)'s are the only points in the diagram on the curve \(y = -\ln x\). Other points lie above.