Symbols and Assumptions:

- Number of layers: L
- Neuron count in each layer: $[n_0, n_1, \ldots, n_L]$
- Input/output dimension: $n_0 = d_{in},\ n_L = d_{out}$
- Spline parameters: $D_{spline} = G + K + 1$ (where G = number of grid intervals, K = spline order)
- Total number of edges: $N_{edges} = \sum_{l=0}^{L-1}(n_l \times n_{l+1})$
- Number of pre-output layer nodes: $N_{nodes} = \sum_{l=0}^{L-1} n_l$
- F_{act}: FLOPs for the non-linear activation function used in MLP or KAN (e.g., SiLU)
- C_{spline}: Core B-spline complexity per edge per sample:

  $C_{spline} = 9 \times K \times (G + 1.5 \times K) + 2 \times G - 2.5 \times K$
- Weight generation FLOPs $C_{meta\_gen} = 2d_{hidden} + F_{act}d_{hidden} + 2d_{hidden}(G + K + 1)$

Table 1 FLOPs Comparison Summary

MODEL	FORWARD FLOPS	BACKWARD FLOPS	TOTAL FLOPS
KAN	$F_{act}N_{nodes} + N_{edges}C_{spline}$	$2N_{node}(K^2 + GK) + 3N_{edges}D_{spline}$	$F_{act}N_{nodes} + N_{edges}C_{spline} + 2N_{node}(K^2 + GK) + 3N_{edges}D_{spline}$
MetaKAN	$F_{act}N_{nodes} + N_{edges}C_{spline} + N_{edges}C_{meta\_gen}$	$2N_{edges} + 2C_{meta\_gen}$	$F_{act}N_{nodes} + N_{edges}C_{spline} + (2N_{edges} + 4d_{hidden})D_{spline}$