

Maths of the Day

$$\int_0^1 \sum_{k=1}^n (n-k)!(k-1)! \frac{Li_{n-k+1}\left(\frac{x}{x-1}\right) Li_k\left(\frac{x}{x-1}\right)}{x^2} dx$$
$$= 2 \cdot n! (\zeta(2) + \zeta(3) + \dots + \zeta(n+1))$$