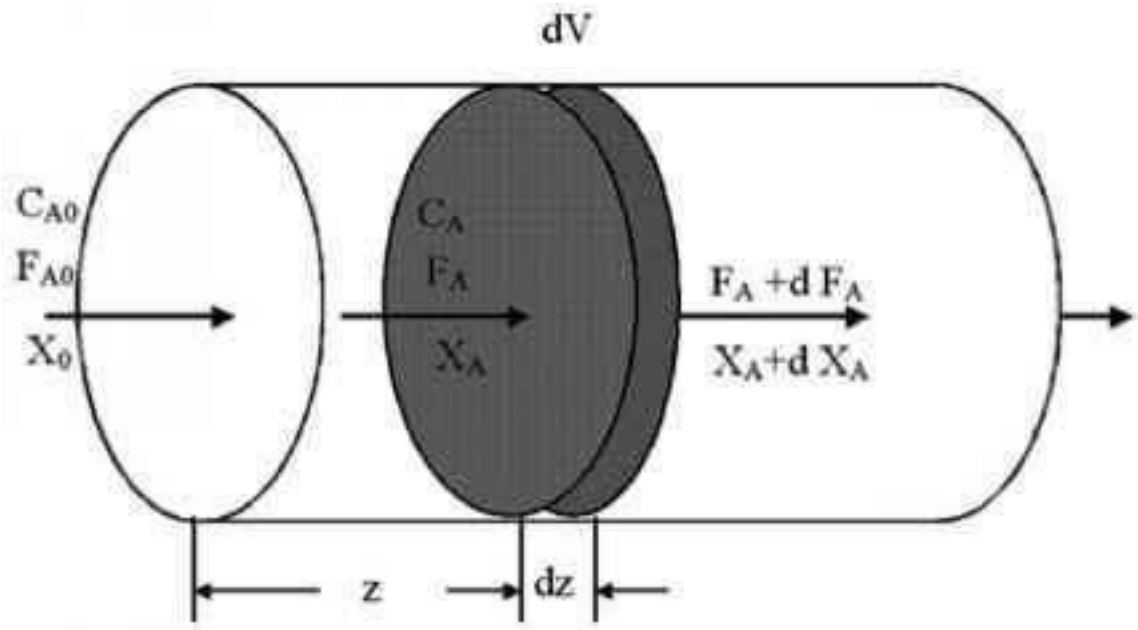
# CLL:113-Tut-8

**Q1.** A. Develop a user-friendly computer program for multiple segments (a) Trapezoidal and (b) Simpson's 1/3 rule and (c) Simpson's 3/8 rule
Test it by integrating:

$$\int_0^1 x^{0.1}(1.2 - x)(1 - e^{20(x-1)})dx$$

Use the true value of 0.602298 to compute $\varepsilon_t$
B. For each case, draw the true error as a function of the number of segments. Does the error always decrease with increase in number of segments?

**Q2.**




In the plug flow reactor

$$V = \frac{F_{A0}}{kC_{A0}^{n}} \int_0^{X_{A\_EXIT}} \frac{dx_A}{(1 - x_A)^n}$$

Where the value of the pre-factor before the integral has value 2 $m^3$ and value of n=1.25

. Find the Volume required for 90% conversion
Use (i) Trapezoidal Rule, (ii) Simpsons $1/3^{rd}$ and (iii) Simpsons $3/8^{th}$ Rule
and find the value of N(subdomains) required in each case to reach convergence (tol=0.001).
You can use Excel or C programming to do this.