11.9.5.31

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Question 31: A manufacturer reckons that the value of a machine, which costs him Rs.15625, will depreciate each year by 20%.Find the estimated value at the end of 5 years.

Solution:

Symbol	Value	Description
$x(0)$	15625	Initial Cost
r	$\frac{4}{5}$	common ratio of GP
n	5	Number of years
$x(5)$	$15625(\frac{4}{5})^5$	Estimated value after 5 years

TABLE 1: Parameter Table

$$x(n) = 15625\left(1 - \frac{1}{5}\right)^n u(n) \tag{1}$$

Result:

$$a^n u(n) \xleftrightarrow{\mathcal{Z}} \frac{1}{(1 - az^{-1})} \quad |z| > a \tag{2}$$

From (**??**)

$$X(Z) = \frac{15625}{1 - \left(1 - \frac{1}{5}\right)z^{-1}} \quad |z| > \frac{4}{5} \tag{3}$$

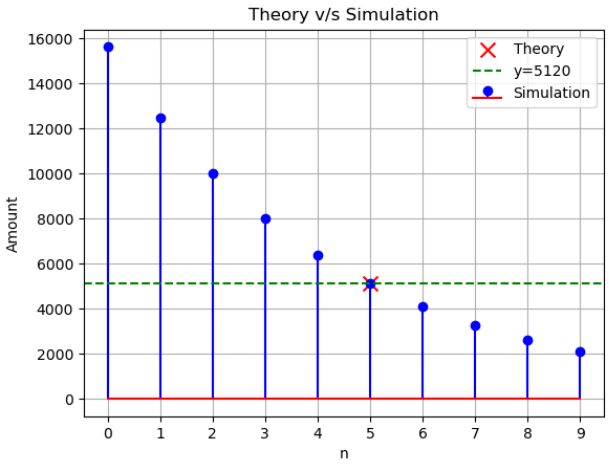

Fig. 0: Theory matches with simulated values