Stock price is 730 ₹ and r = 7.5%.

two months put option with exercise price of 500 has a price (premium) of ₹10, but due to low liquidity there is no listed call of two months. Ideally what should be the value of call option.

$$C + P = S - ke^{-rt}$$

$$c = 10 + 730 - 500 (e^{-0.0125})$$

$$= 296.2 \text{ INR}$$

$$\left(rt = \frac{7.5}{100} \times \frac{2}{12} = 0.0125 \right)$$

Put - call parity

According to B-S-M Equation -

$$c = S_0 N(d_1) - ke^{-rT} N(d_2)$$

$$p = ke^{-rT} N(-d_2) - S_0 N(-d_1)$$

$$d_1 = \frac{\ln(S_0/k) + (r + \sigma^2/2) T}{\sigma \sqrt{T}}$$

$$d_2 = d_1 - \sigma \sqrt{T}$$

rearranging → $\boxed{c + ke^{-rT} = S_0 + p}$

$$c + ke^{-rT} = S_0 N(d_1) - ke^{-rT} N(d_2) + ke^{-rT}$$

$$= S_0 N(d_1) - ke^{-rT} [N(d_2) - 1]$$

$$\longrightarrow ①$$

$$p + S = ke^{-rT} N(-d_2) - S_0 N(-d_1)$$

$$+ S_0$$

$$= ke^{-rT} N(-d_2) - S_0 [N(-d_1) - 1]$$

$$\longrightarrow ②$$

Eq^n ① and ② are same.

(why?)