In preparation for the next class, please solve the following problems:

**Problem 2.1.** (5 points) For a continuous-dividend-paying asset whose price is denoted by \( S = \{ S(t), t \geq 0 \} \) with the dividend yield \( \delta \), what is the expression for:

(i) (2 points) the **prepaid-forward** price for delivery of one unit of the asset at time \(-T\);
(ii) (3 points) the **forward** price for delivery of one unit of the asset at time \(-T\)

**Solution:**

\[
F_{0,T}^{P}(S) = e^{-\delta T} S(0), \quad F_{0,T}(S) = e^{(r-\delta)T} S(0).
\]

**Problem 2.2.** (4 points) Consider an asset with the price is denoted by \( S = \{ S(t), t \geq 0 \} \).

(2 points) What is the expression for the **payoff** of a long \( K \)–strike European call on that asset with exercise date \( T \)?

**Solution:**

\[
V_{C}(T) = (S(T) - K)_{+}
\]

(2 points) What is the expression for the **payoff** of a long \( K \)–strike European put on that asset with exercise date \( T \)?

**Solution:**

\[
V_{P}(T) = (K - S(T))_{+}
\]

**Problem 2.3.** (6 points)

Consider an asset with the price is denoted by \( S = \{ S(t), t \geq 0 \} \).

Portfolio \( A \) consists of the following components:

- a long \( K \)–strike European call on \( S \) with exercise date \( T \), and
- a short \( K \)–strike European put on \( S \) with exercise date \( T \).

Draw the payoff curve of the above portfolio.

**Solution:**

[Graph showing the payoff curve of the portfolio A.]