

## SOLO LANE GANKING CASE

### **Escaping Formula :**

#### Description:

This formula is used to simulate the laner escaping probability. All three players warding stats are involved in the process of the formula as well as the teamplay stat from both sides.

#### Involved parameters explanation:

Blue side warding allows awareness concerning the red jungler presence near the lane. Red side warding can provide information concerning the location and timing of any wards put on the map by the blue team.

Moreover, for the blue team, teamplay is involved so the laner knows the red jungler most recent location or any existing wards. For the red team, communication about warding and whether the lane is push makes the gank likely to be succesful.

In order to balance the formula, the red warding stats will be reduced.

#### Formula Details:

We consider a gank from the red jungler on a solo lane, with no possibility of counter-gank. As a result, two red players will fight against one blue player.

Let  $B_a$  and  $R_a$  be the respective blue side and red side awareness coefficients so that :

$$B_a = W_{bl} + T_b \times 0,2$$

$$R_a = (W_{rl} + W_{rj}) \times 0,8 + T_r \times 0,4$$

With  $W_{rj}$ ,  $W_{rl}$ ,  $W_{bl}$  the respective red jungler, red laner and blue laner warding stat.  $T_r$  et  $T_b$  the respective red team and blue team teamplay stat.

At the turn when the gank begins, a successful escape will lead to no trading phase and to the end of the fight. We will therefore consider that the blue laner has successfully escaeped from the fight when:

$$N \leq \frac{B_a}{B_a + R_a} \times 100$$

With N a random number between 0 and 100 generated at the beginning of the turn.

### **Trade Formula :**

#### Description:

The trade formula is used to process the amount of HP lost during the turn for every player involved in the fight. Whenever a player's HP reach 0, the player is dead. All players mechanics and role affinity stats will be involved, as well as the jungler ganking stat, the synergy between the jungler and his laner, the lane matchup stat, the presence of a turret in the fight and finally the amount of gold earned since the beginning of the game.

#### Involved parameters explanation:

Obviously, mechanics and role affinity are involved since they rule the way the players will play. Earned gold is too since a ganked player with lower gold will be easier to kill. The jungler ganking stat rates the quality of the engage and the teamplay stat the ability to coordinate during the fight. Synergy has its role to play for the same reason. The presence of a turret is obviously meaningful in such a trade as it is a huge source of damage.

#### Formula Details:

We consider a gank from the red jungler on a solo lane, with no possibility of counter-gank. As a result, two red players will fight against one blue player.

We define  $D_{Bl}$ ,  $D_{Rl}$  and  $D_{Rj}$  the HP lost percentage lost during the trade respectively by the blue laner, the red laner and the red jungler so that :

$$D_{Bl} = 10 \times (t_r + (1 + \frac{T_r + G_{rj} + 0,7m_r + 0,3S_r}{100}) (\frac{g_{rj}g_{rl}}{g_{bl}} \times \frac{A_{bl}}{A_{rl} + A_{rj}} \times \frac{M_{rj} + M_{rl}}{2M_{bl}}))$$

$$D_{Rl} = 10 \times (0,5t_b + (1 + \frac{0,15m_b}{100}) (\frac{g_{bl}}{2g_{rl}} \times \frac{A_{rl} + A_{rj}}{A_{bl}} \times \frac{2M_{bl}}{M_{rj} + M_{rl}}))$$

$$D_{Rj} = 10 \times (0,5t_b + (1 + \frac{0,15m_b}{100}) (\frac{g_{bl}}{2g_{rj}} \times \frac{A_{rl} + A_{rj}}{A_{bl}} \times \frac{2M_{bl}}{M_{rj} + M_{rl}}))$$

With  $t_r$  and  $t_b$  the respective red and blue turret presence (equals 1 when the turret is involved, else 0);  $g_{bl}$ ,  $g_{rl}$  and  $g_{rj}$  the gold earned respectively by the blue laner, the red laner and the red jungler ;  $A_{bl}$ ,  $A_{rl}$  and  $A_{rj}$  the respective blue laner, red laner and red jungler role affinity;  $M_{bl}$ ,  $M_{rj}$  and  $M_{rl}$  the respective blue laner, red jungler and red laner mechanics stat;  $G_{rj}$  the red jungler ganking stat;  $T_r$  the red team teamplay stat;  $S_r$  the red team synergy and  $m_r$ ,  $m_b$  the respective matchup advantage for the red laner and the blue laner.

#### **Fight Ending :**

Considering that no evasion has been successful, the fight reaches the end when one of the two sides lost all of its fight members.

## **BOT LANE GANKING CASE**

### **Escaping Formula :**

Description:

Involved parameters explanation:

Formula Details:

### **Trade Formula :**

Description:

Involved parameters explanation:

Formula Details: