Conventional Strafe Jumping

Conventional strafe jumping makes use of the fact the resultant speed from combined forward-strafe movement is greater than forward movement alone. The 'jumping' part is important since it allows the direction of travel to be corrected to match the desired one.

Conventional strafe jumping begins with the player making a forward-strafe-jump, followed by a turn into the direction of travel. NOTE: forward and strafe actions are always relative to the player's view direction. The velocity of the initial jump can be represented by a vector triangle as illustrated in figure 1. below.

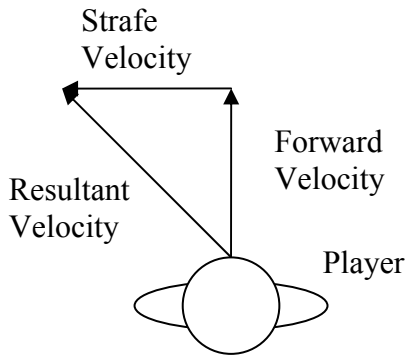


Figure 1. Velocity Vector components of strafe jump.

For many First Person Shooter (FPS) games, the proportions of forward and strafe (lateral) movement are the same. Typically if the strafe and forward impulses occur at the same time, the resulting player movement will be at 45 degrees to the forward-facing direction, and be √2 or 1.414 times the value of the forward speed alone. NOTE: this beneficial resultant factor decreases as forward speed is increased.

If the player whilst in the jump, turn into the direction of resultant travel, the resultant velocity becomes their forward velocity. Moreover the accelerations experiences by both are combined into a similar vector (not illustrated here). Upon landing the process is repeated, each time the strafe acceleration and velocity being combined into the final velocity.

Initially when the angle is 45 degrees, the amount of turn required is very high, but the turn angle quickly decreases (to 35.3 degrees on second jump). See section 'Discussion of Resultant Angle Changes' later.

Technique Comments

Following the resultant velocity towards the same strafe direction results in a technique known as 'circular jumping', where a brief period of strafe and turn quickly increases the velocity. This is also sometimes referred to as 'banana jumping'.

Many FPS players will typically make their turn immediately in a flick following the jump, even positioning themselves for the next jump prior to jumping so that the time spend facing in the direction of travel can be maximised. Optimising this technique is as much done by feeling as anything else, and many players simply take it foregranted. A series of strafe-jumps and required turns can allow the player to travel approximately in a straight line, see figure 3.

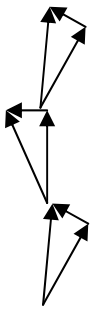
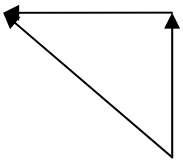


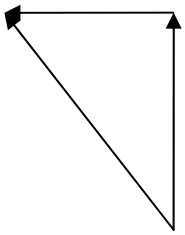
Figure 2. Combined Linear Strafe Jumping

Discussion of Resultant Angle Changes

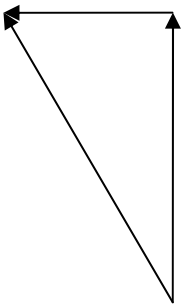
As the strafe jumps add to forward velocity, the resultant angles for subsequent strafe jumps decreases from 45 degrees. Figure 3 illustrates how this angle decreases.



(a) Forward:strafe velocity 1:1, resultant angle 45 degrees to forward-facing direction.



(b) Forward:strafe velocity 1:1.5, resultant angle 33.7 degrees to forward-facing direction.



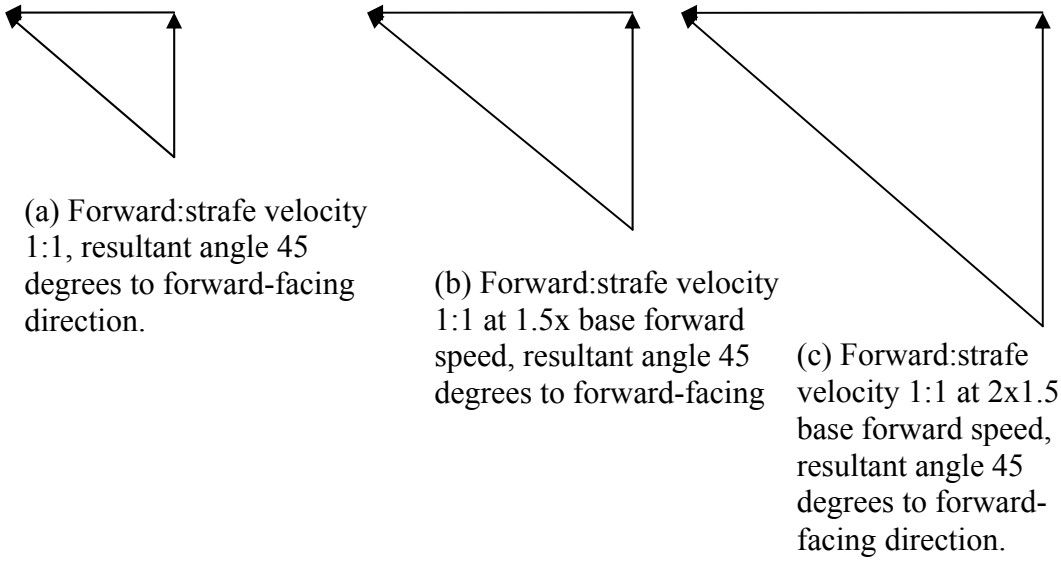
(c) Forward:strafe velocity 1:2, resultant angle 26.6 degrees to forward-facing direction.

Figure 3. Effect of forward velocity on strafe jump angle.

As speed is built up, the resultant angle of strafe jump in relation to the forward facing direction decreases meaning that minimal turning is required whilst strafe-jumping. This is even lower when strafe impulse is lower than forward impulse. The other point to note here is that as forward speed increases, the resultant velocity benefit diminishes.

Painkiller's Strafe-Jump Differences

Painkiller (PK) has taken the initial 45 degree angle seen in most FPS games, but fixed this throughout the strafe jumping. In order to maintain this 1:1 forward:strafe, the PK strafe is actually increased to match the forward speed. This actually equates to both the strafe velocity, and the accompanying impulse/acceleration to achieve that velocity being increased, even more than the forward impulse/acceleration. See figure 4.



(a) Forward:strafe velocity 1:1, resultant angle 45 degrees to forward-facing direction.

(b) Forward:strafe velocity 1:1 at 1.5x base forward speed, resultant angle 45 degrees to forward-facing

(c) Forward:strafe velocity 1:1 at 2x1.5 base forward speed, resultant angle 45 degrees to forward-facing direction.

Figure 4. PK Strafe-Jumping Components at Different Speeds.

Because of this strafe increase, the turn angles are continuously unmanageable. In addition the usual strafe turn flicks which are used normally are far too small to make use of the continuous 45 degrees turn angle, and a large amount of forward impetus is lost when trying to make use of a single strafe.

NOTE: The 45 degrees at speed has nothing to do with forward, strafe, backward strafe impulse proportions.

In conventional FPS strafe jumping arrangements, the first few jumps are the hardest but also the most valuable to achieve a faster velocity. In PK the uncontrollability of the lateral movement makes strafe jumping in PK impossible to use.