-> representation of velocity of frame B relative to C observed from O (eqn 1)

^A v^B\_C = (^A R\_O \* ^O v^B\_C) + (^A v^O\_A) + (^A ω^O\_A × ^A r^B\_A) -> this eqn given by claude is re-written below, don’t worry if you don’t understand.

-> when the eqn 1 is transformed into A frame. (basically, the observation of B’s velocity is transformed)

**Explanation** onto why only rotation matrix affects the above transformation of velocity observation

Frame O -> Frame A => Rot(O, A) + Trans(O, A)

^A p = ^A R\_O \* ^O p + ^A p\_O

-> Pose vector involves rotation and translation

-> time derivative of pose vector (chain rule applied)

, where is the angular skew symmetric matrix

-> as R is an orthogonal matrix (rotational matrix)

**= 0** -> taking time derivative applying chain rule, identity matrix is constant hence its derivative is 0.

A\*B = (B\*A)^T -> Matrix property

Representing as A, we have

So is a skew symmetric matrix. Since R is an orthogonal matrix,

Now, writing , where A is the skew symmetric matrix (technically Angular skew symmetric matrix to be specific).

From the above eqn, we get , obtained by just post multiplying R on both sides.

This **A** is what has been represented as in the earlier equation.