

**Corollary 0.0.1** (integration by parts formula). *Given two continuous semimartingales  $X$  and  $Y$ , then*

$$X_tY_t = X_0Y_0 + \int_0^t X_u\,dY_u + \int_0^t Y_u\,dX_u + \langle X,Y\rangle_t$$

*or equivalently,*

$$dX_tY_t = X_t\,dY_t + Y_t\,dX_t + d\langle X,Y\rangle_t.$$

*If at least one of  $X$  or  $Y$  is a process of finite variation, then*

$$dX_tY_t = X_t\,dY_t + Y_t\,dX_t.$$