Theorem 0.0.1 (Doob–Meyer decomposition theorem). *Let X be a non-negative continuous submartingale*[1]. *Then there exists a continuous increasing process A with $A_0 = 0$ such that the process $M = X - A$ is a continuous martingale. The processes M and A in the Doob–Meyer decomposition*

$$X = M + A$$

are unique up to indistinguishability of stochastic processes (Definition 2.1.3).

[1] A more general version of the theorem applies to any càdlàg supermartingale of class D.