

$$(7) \quad W_t^4 = E(W_t^4) + \varphi W_t$$

$$\varphi = ?$$

$$\xi = E\xi + \varphi W_t$$

$$X_T = W_t = B_t$$

$$E(W_t^4) = (2n-1)!! = 3$$

$$W_t \sim N(0, t)$$

$$\Rightarrow W_t^4 = 3 + \int_0^t W_s^2 ds$$

$$X_t = \int_0^t \varphi_s ds$$

$$X_T = X_0 + \int_0^T \varphi_s ds \Rightarrow dX_t = \varphi_t dt$$

$$X_t = E(X_t | F_t) = E(W_t^4 | F_t) = E((W_t - W_t + W_t)^4 | F_t) =$$

$$= E((W_t - W_t)^4 + 4(W_t - W_t)^3 W_t + 6(W_t - W_t)^2 W_t^2 + 4(W_t - W_t) W_t^3 + W_t^4 | F_t) =$$

$$= E(W_t - W_t)^4 + 4W_t E(W_t - W_t)^3 + 6W_t^2 E(W_t - W_t)^2 + 4W_t^3 E(W_t - W_t) + W_t^4 =$$

$$= 3(1-t)^2 + 6W_t^2(1-t) + W_t^4$$

$$\begin{array}{r} 1 \\ 1 \ 1 \\ 1 \ 2 \ 1 \\ 1 \ 3 \ 3 \ 1 \\ 1 \ 4 \ 6 \ 4 \ 1 \end{array}$$

$$X_T = X_0 + \int_0^T X_s dW_s$$

$$\Rightarrow dX_t = X_t dW_t$$

$$dX_t = X_t dW_t$$

$$dX_t = \varphi_t dW_t$$

Maß für dX_t , was γ und $X_t = W_t$
 $dX_t = dW_t$

$$\text{Ist also: } X_t = 3(1-t)^2 + 6W_t^2(1-t) + W_t^4$$

$$f(x, t) = 3(1-t)^2 + 6x^2(1-t) + x^4$$

$$f'_t = -6(1-t) - 6x^2$$

$$f'_x = 12x(1-t) + 4x^3$$

$$f''_{xx} = 12(1-t) + 12x^2$$

$$\Rightarrow dV_t = (-6(1-t) - 6W_t^2)dt + (12W_t(1-t) + 4W_t^3)dW_t + \frac{1}{2}(12(1-t) + 12W_t^2)dt =$$

$$= (-6(1-t) - 6W_t^2 + 6(1-t) + 12W_t^2)dt + (12W_t(1-t) + 4W_t^3)dW_t = \varphi_t dW_t$$

$$= (-6(1-t) - 6W_t^2 + 6(1-t) + 12W_t^2)dt + (12W_t(1-t) + 4W_t^3)dW_t = \varphi_t dW_t$$

$$\parallel_0$$

$$\Rightarrow \varphi_t = 12W_t(1-t) + 4W_t^3$$