Think (22) as $\mathbb{E}[Y \mid Y'=0]$ is not well defined!

should actually be:

$Y'' =$

$Y = X^2 \quad Y' = 2X'X \quad Y'' = 2X'^2 + 2X^T X''$

---

$Y'$

$$\int_{\mathbb{R}^D} |\det \nabla^2 y| \, \mathbb{I}[\nabla^2 y \succ 0, \; y > v] \, p_t(0, \nabla^2 y, y)$$

$p_t(\nabla y, 0, \nabla^2 y)$

$$= \mathbb{E}[$$

$p_t = p_{Y(t), \nabla Y(t), \nabla^2 Y(t)}$

Claim:

Given $X, Y$.

$$\int_{\mathbb{R}^2} f(Y) \, p_{X,Y}(0, y) \, dy = \mathbb{E}[f(0, Y)]$$

$$\int f(0, y) \, p_Y(y) \, dy.$$

$$\mathbb{P}(Y = y, \nabla Y = 0, \nabla^2 Y = y'')$$