A linear function of two independent continuous random variables

- The PDF of $2X - Y$? (for independent X, Y)

$$f_{X+Y}(z) = \int_{-\infty}^{\infty} f_X(x) f_Y(z-x)\, dx$$

$$(2x) + (-Y)$$

$$f_{2X-Y}(z) = \int_{-\infty}^{\infty} f_{2X}(x)\, f_{-Y}(z-x)\, dx$$

$$f_{aX}(y) = \frac{1}{|a|} f_X\left(\frac{y}{a}\right)$$

$$f_{2X}(x) = \frac{1}{2} f_X(x/2) \qquad f_{-Y}(Y) = f_Y(-Y)$$

$$f_{-Y}(z-x) = f_Y(x-z)$$

$$f_{2X-Y}(z) = \int_{-\infty}^{\infty} \frac{1}{2} f_X(x/2) f_Y(x-z)\, dx$$