

$$5(\sin x + \cos x) + \sin 3x - \cos 3x = 2\sqrt{2}(2 + \sin 2x)$$

$$5(\sin x + \cos x) - 4\sin^3 x + 3\sin x - (-3\cos x + 4\cos^3 x) = 2\sqrt{2}(2 + 2\sin x \cos x)$$

$$8(\sin x + \cos x) - 4(\sin^3 x + \cos^3 x) = 2\sqrt{2}(2 + 2\sin x \cos x)$$

$$8(\sin x + \cos x) - 4(\sin^3 x + \cos^3 x) = 4\sqrt{2}(1 + \sin x \cos x)$$

$$2(\sin x + \cos x) - (\sin^3 x + \cos^3 x) = \sqrt{2}(1 + \sin x \cos x)$$

$$2(\sin x + \cos x) - (\sin^3 x + \cos^3 x) = \sqrt{2}(1 + \sin x \cos x)$$

$$2(\sin x + \cos x) - (\sin x + \cos x)(\sin^2 x - \sin x \cos x + \cos^2 x) = \sqrt{2}(1 + \sin x \cos x)$$

$$(\sin x + \cos x)[2 - (\sin^2 x - \sin x \cos x + \cos^2 x)] = \sqrt{2}(1 + \sin x \cos x)$$

$$(\sin x + \cos x)[2 - (1 - \sin x \cos x)] = \sqrt{2}(1 + \sin x \cos x)$$

$$(\sin x + \cos x)[1 + \sin x \cos x] = \sqrt{2}(1 + \sin x \cos x)$$

$$(1 + \sin x \cos x)[(\sin x + \cos x) - \sqrt{2}] = 0$$

$$1 + \sin x \cos x = 0$$

$$\sin x \cos x = -1$$

$$\sin x = 1 \quad x = \pi/2 + 2\pi k$$

$$\cos x = -1 \quad x = \pi + 2\pi k$$

$$\sin x = -1 \quad x = -\pi/2 + 2\pi k$$

$$\cos x = 1 \quad x = 2\pi k$$

нет решений

$$\frac{1}{2} \sin 2x = -1$$

$$\sin 2x = -2$$

нет решений

$$(\sin x + \cos x) - \sqrt{2} = 0$$

$$1 \cdot \sin x + 1 \cdot \cos x = \sqrt{2}$$

$$\sin(x + \pi/4) = 1$$

$$x = \pi/4 + 2\pi k$$

Answer:  $x = \pi/4 + 2\pi k$ .