BIQUADRATISCHE GLEICHUNGEN

$$ax^4 + bx^2 + c = 0$$

$$ax^4 + bx^2 + c = 0$$

Aufgabe 1

$+ 1{,}00\ x^4 - 5{,}0\ x^2 + 4{,}00 = 0$

$z = x^2$

$+ 1{,}00\ z^2 - 5{,}0\ z + 4{,}00 = 0 \quad | : 1{,}00$

$+ 1{,}00\ z^2 - 5{,}0\ z + 4{,}00 = 0$

$z_{1,2} = 2{,}5 \pm \sqrt{6{,}250 - 4{,}0}$

$z_{1,2} = 2{,}5 \pm 1{,}500$

$z_1 = 4{,}000 \quad ; \quad z_2 = 1{,}000$

$x_1 = 2{,}000$	$x_3 = 1{,}000$
$x_2 = -2{,}000$	$x_4 = -1{,}000$

Aufgabe 2

$-1{,}00\ x^4 + 1{,}2500\ x^2 - 0{,}2500 = 0$

$z = x^2$

$-1{,}00\ z^2 + 1{,}3\ z - 0{,}25 = 0 \quad | : -1{,}00$

$+ 1{,}00\ z^2 - 1{,}3\ z + 0{,}25 = 0$

$z_{1,2} = 0{,}6 \pm \sqrt{0{,}391 - 0{,}3}$

$z_{1,2} = 0{,}6 \pm 0{,}375$

$z_1 = 1{,}000 \quad ; \quad z_2 = 0{,}250$

$x_1 = 1{,}000$	$x_3 = 0{,}500$
$x_2 = -1{,}000$	$x_4 = -0{,}500$

Aufgabe 3

$+ 2{,}00\ x^4 - 24{,}0\ x^2 - 128{,}00 = 0$

$z = x^2$

$+ 2{,}00\ z^2 - 24{,}0\ z - 128{,}00 = 0 \quad | : 2{,}00$

$+ 1{,}00\ z^2 - 12{,}0\ z - 64{,}00 = 0$

$z_{1,2} = 6{,}0 \pm \sqrt{36{,}000 + 64{,}0}$

$z_{1,2} = 6{,}0 \pm 10{,}000$

$z_1 = 16{,}000 \quad ; \quad z_2 = -4{,}000$

$x_1 = 4{,}000$	$x_3 =$ keine Lsung
$x_2 = -4{,}000$	$x_4 =$ keine Lsung

Aufgabe 4

$-3{,}00\ x^4 + 9{,}0\ x^2 - 6{,}00 = 0$

$z = x^2$

$-3{,}00\ z^2 + 9{,}0\ z - 6{,}00 = 0 \quad | : -3{,}00$

$+ 1{,}00\ z^2 - 3{,}0\ z + 2{,}00 = 0$

$z_{1,2} = 1{,}5 \pm \sqrt{2{,}250 - 2{,}0}$

$z_{1,2} = 1{,}5 \pm 0{,}500$

$z_1 = 2{,}000 \quad ; \quad z_2 = 1{,}000$

$x_1 = 1{,}414$	$x_3 = 1{,}000$
$x_2 = -1{,}414$	$x_4 = -1{,}000$

Aufgabe 5

$+ 0{,}50\ x^4 - 6{,}0\ x^2 + 13{,}50 = 0$

$z = x^2$

$+ 0{,}50\ z^2 - 6{,}0\ z + 13{,}50 = 0 \quad | : 0{,}50$

$+ 1{,}00\ z^2 - 12{,}0\ z + 27{,}00 = 0$

$z_{1,2} = 6{,}0 \pm \sqrt{36{,}000 - 27{,}0}$

$z_{1,2} = 6{,}0 \pm 3{,}000$

$z_1 = 9{,}000 \quad ; \quad z_2 = 3{,}000$

$x_1 = 3{,}000$	$x_3 = 1{,}732$
$x_2 = -3{,}000$	$x_4 = -1{,}732$

Aufgabe 6

$+ 0{,}25\ x^4 - 1{,}5000\ x^2 + 2{,}0000 = 0$

$z = x^2$

$+ 0{,}25\ z^2 - 1{,}5\ z + 2{,}00 = 0 \quad | : 0{,}25$

$+ 1{,}00\ z^2 - 6{,}0\ z + 8{,}00 = 0$

$z_{1,2} = 3{,}0 \pm \sqrt{9{,}000 - 8{,}0}$

$z_{1,2} = 3{,}0 \pm 1{,}000$

$z_1 = 4{,}000 \quad ; \quad z_2 = 2{,}000$

$x_1 = 2{,}000$	$x_3 = 1{,}414$
$x_2 = -2{,}000$	$x_4 = -1{,}414$