

# Übung 10.4 - Mathe für die Informatik I

```
def GramSchmidt(v eclist):
    orthonormalbasis = []
    for Element in range(len(v eclist)):
        if orthonormalbasis == []:
            if v eclist[Element].is_zero():
                pass
            else:
                orthonormalbasis.append(v eclist[Element].normalized())
        else:
            orthonormal = v eclist[Element]
            for Element2 in range(len(orthonormalbasis)):
                orthonormal = orthonormal -
(orthonormal.dot_product(orthonormalbasis[Element2]) *
orthonormalbasis[Element2])

            if orthonormal.is_zero():
                pass
            else:
                orthonormal = orthonormal.normalized()
                orthonormalbasis.append(orthonormal)

    return(orthonormalbasis)
```

```
v eclist = [vector([0, 0, 0]), vector([2, 0, 0]), vector([0, 2, 0]),
vector([0, 0, 0]), vector([0, 0, 2]), vector([999, 999, 999])]
v eclist2 = [vector([25, 3, 11]), vector([3, 1, 2]), vector([2, 2, 2])]

vektoren = GramSchmidt(v eclist)
for v in range(len(vektoren)):
    print('Vektor Nr. ' + str(v + 1) + ': ' + str(vektoren[v]))

print(' ')

vektoren2 = GramSchmidt(v eclist2)
for v in range(len(vektoren2)):
    print('Vektor Nr. ' + str(v + 1) + ': ' + str(vektoren2[v]))
```

```
Vektor Nr. 1: (1, 0, 0)
Vektor Nr. 2: (0, 1, 0)
Vektor Nr. 3: (0, 0, 1)
```

```
Vektor Nr. 1: (5/151*sqrt(755), 3/755*sqrt(755), 11/755*sqrt(755))
Vektor Nr. 2: (-47/114*sqrt(114/151), 91/114*sqrt(114/151),
41/57*sqrt(114/151))
Vektor Nr. 3: (5/6*sqrt(6/95), 17/6*sqrt(6/95), -8/3*sqrt(6/95))
```