

Mathe1_Übung10.4

```
def GramSchmidt(vecList):
    output_list = []

    for vector in range(len(vecList)):
        if output_list == []:
            if not vecList[vector].is_zero():
                temporary = vecList[vector].normalized()
                output_list.append(temporary)

        else:
            new_vector = vecList[vector]
            for vector2 in range(len(output_list)):
                new_vector = new_vector - \
                    (output_list[vector2].dot_product(new_vector) *
                     output_list[vector2])

            if not new_vector.is_zero():
                new_vector = new_vector.normalized()
                output_list.append(new_vector)

    return(output_list)
```

```
vecList = [vector([1, 0, 2, 0]), vector([3, 8, 0, 1]),
            vector([1, 2, 1, 22]), vector([0, 0, 0, 0]),
            vector([3, 2, 4, 12]), vector([0, 2, 5, 5])
            ]
vectors = GramSchmidt(vecList)
for v in vectors:
    print(v)
    print(' ')
```

$(1/5\sqrt{5}, 0, 2/5\sqrt{5}, 0)$

$(12/19\sqrt{1/5}, 40/19\sqrt{1/5}, -6/19\sqrt{1/5}, 5/19\sqrt{1/5})$

$(-326/3202583\sqrt{168557}, -846/3202583\sqrt{168557},$
 $163/3202583\sqrt{168557}, 7746/3202583\sqrt{168557})$

$(348\sqrt{1/168557}, -131\sqrt{1/168557}, -174\sqrt{1/168557},$
 $4\sqrt{1/168557})$