Moduldokumentation

Modul Lineare Algebra und Geometrie (lag)

Simon Wächter

2016

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# Einleitung

## Einleitung

Dieses Dokument stellt die Moduldokumentation für das Modul lag dar. Allfällige Unterlagen sind im Modulordner zu finden.

## Lernziele

Das Modul beinhaltet folgende Lernziele:

* Vektorräume
* Matrix-Algebra
* Vektor-Geometrie
* Lineare und affine Abbildungen
* Ergänzungen

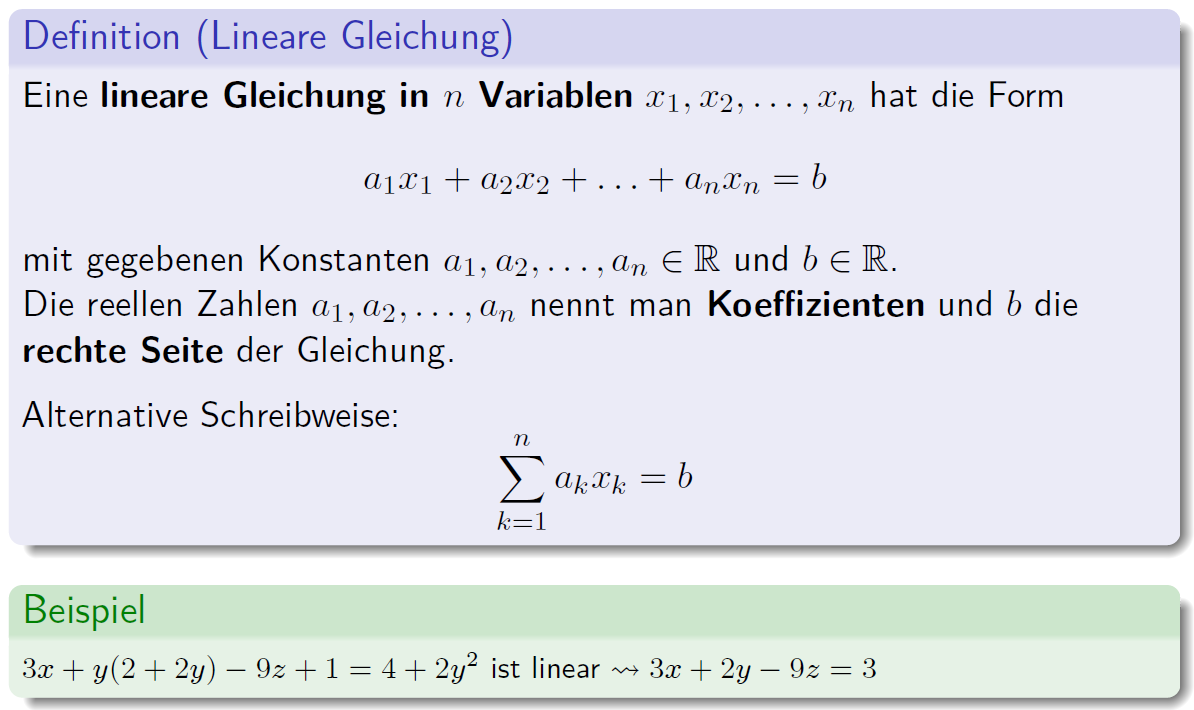
## Prüfungen

Die Modulnote setzt sich zu 50% aus zwei Semesterprüfungen zu je 25% und einer Modulschlussprüfung zu 50% zusammen.

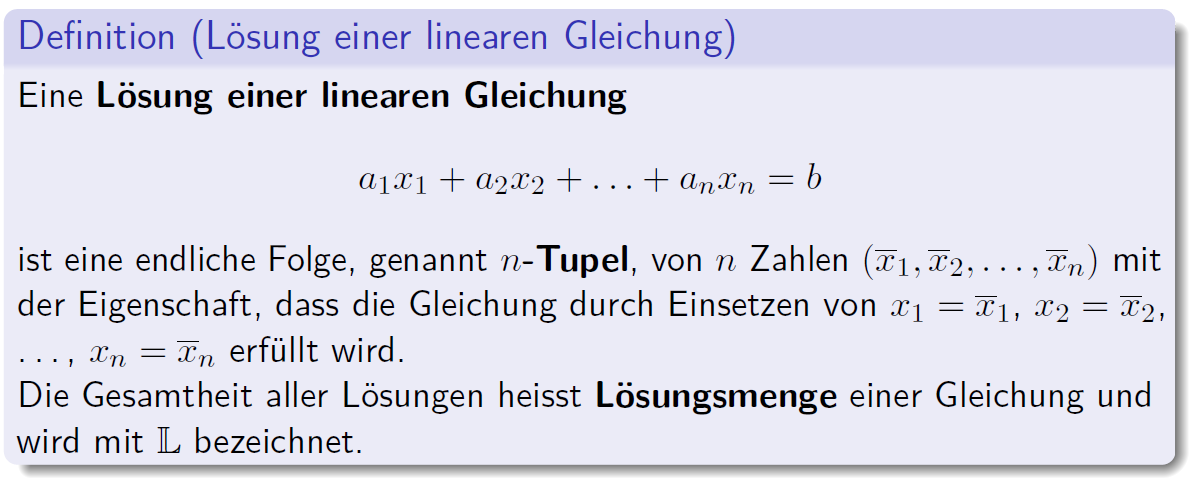
# Woche 1, 2, 3 & 4

## Lineare Gleichungen

### Lineare Gleichung

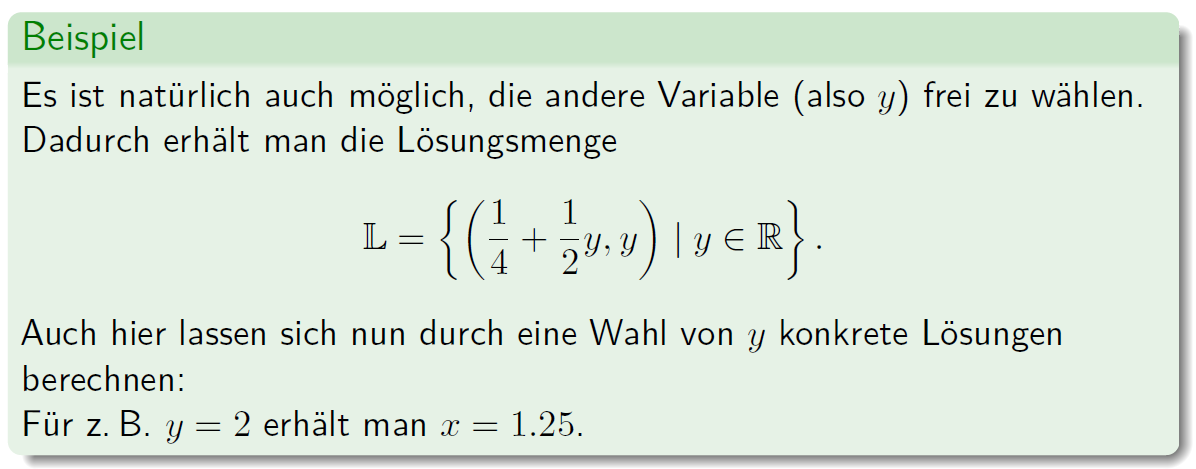


### Lösung einer linearen Gleichung

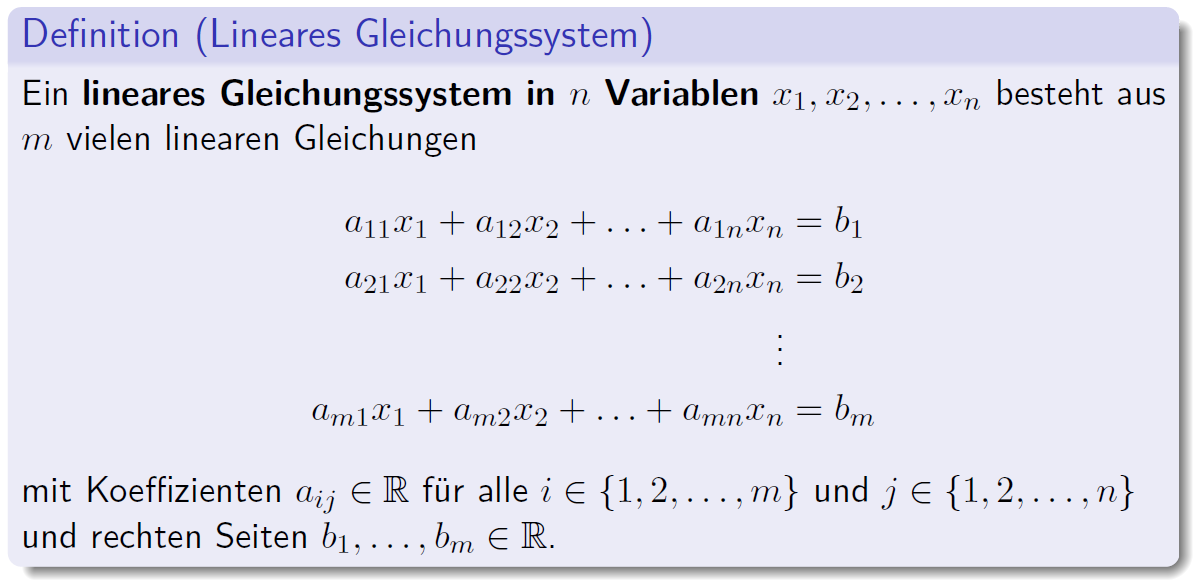


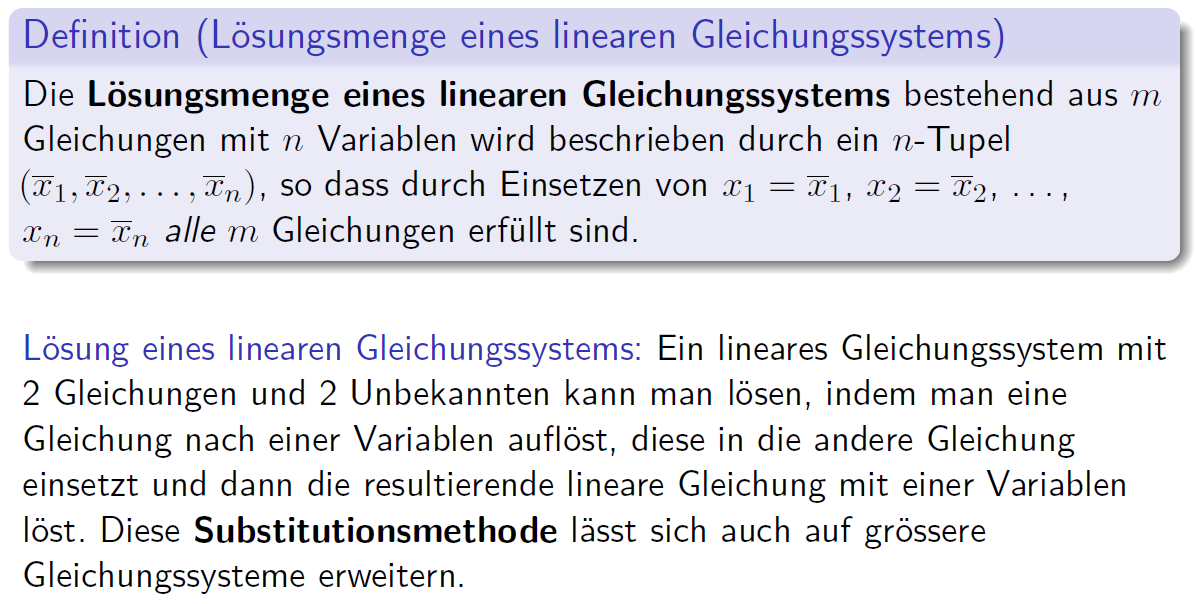
## Lineare Gleichungssysteme

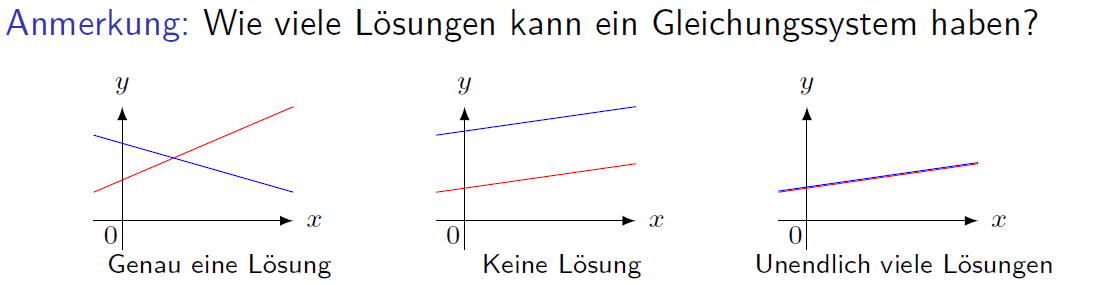
### Lineare Gleichungssysteme

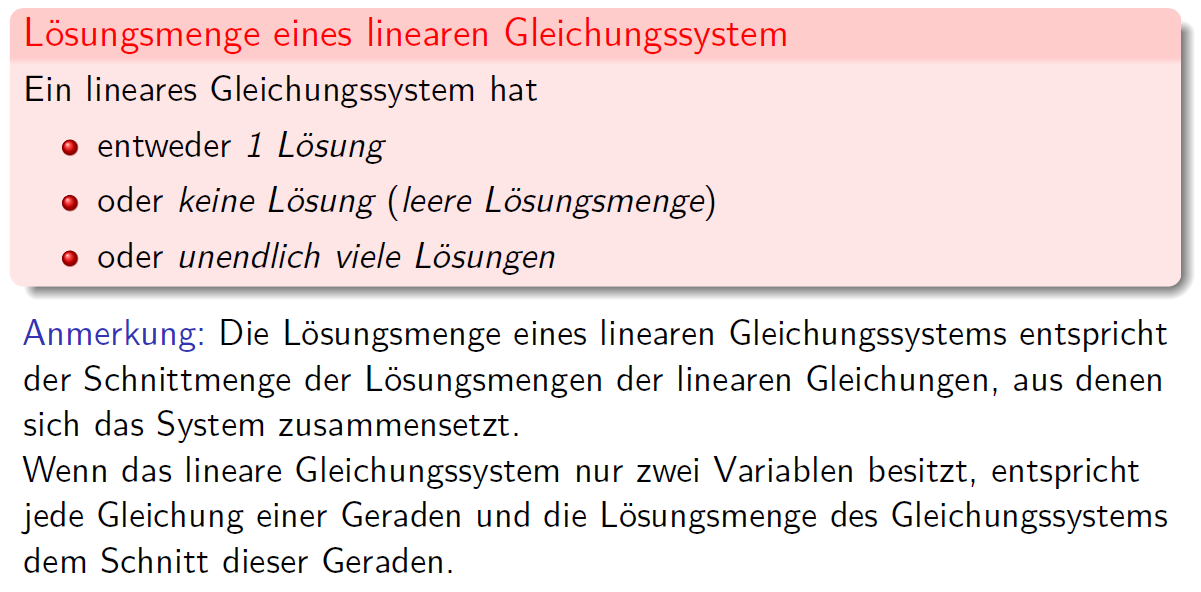


### Lösungsmenge eines linearen Gleichungssystems





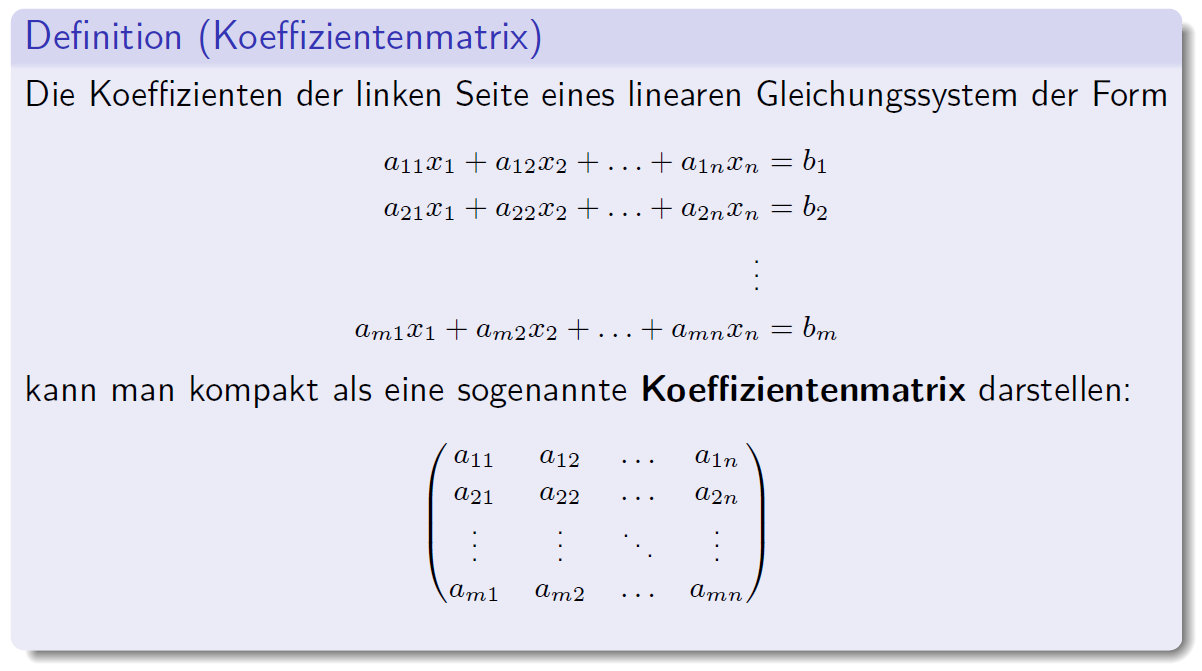


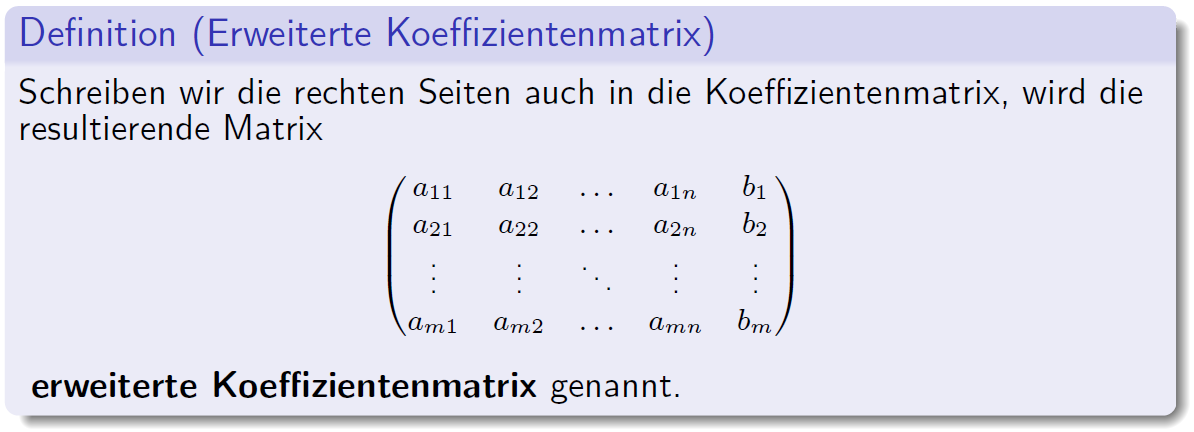


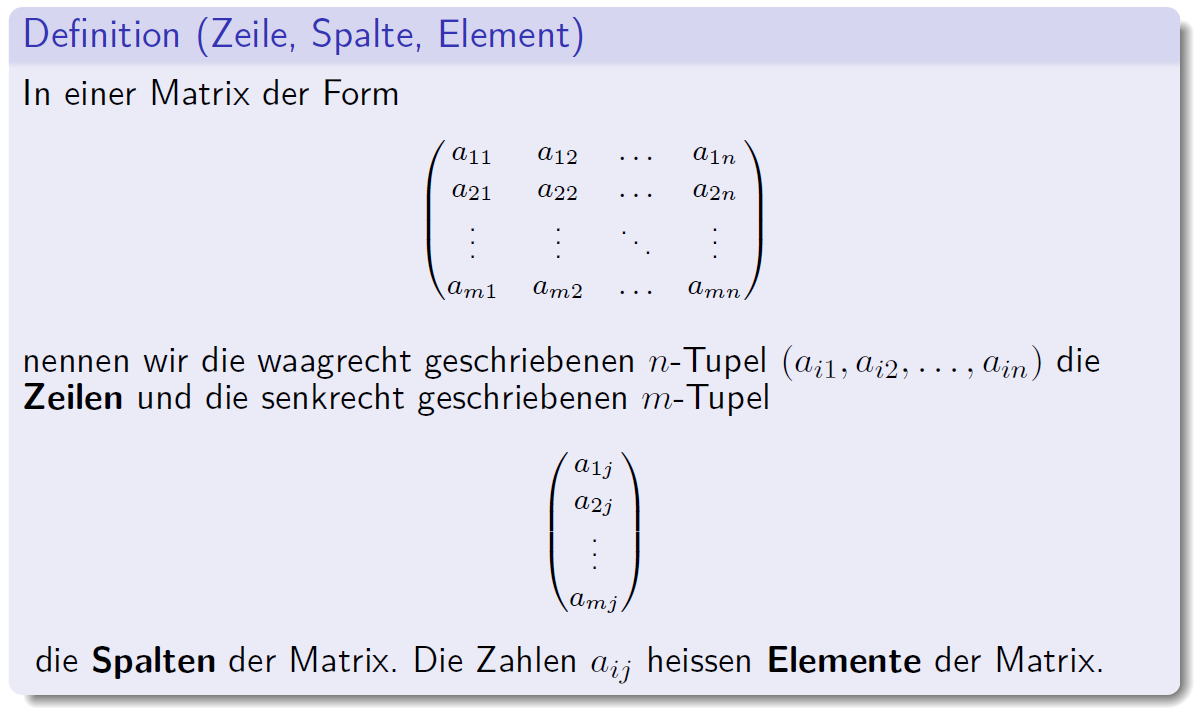
### Homogenes Gleichungssystem



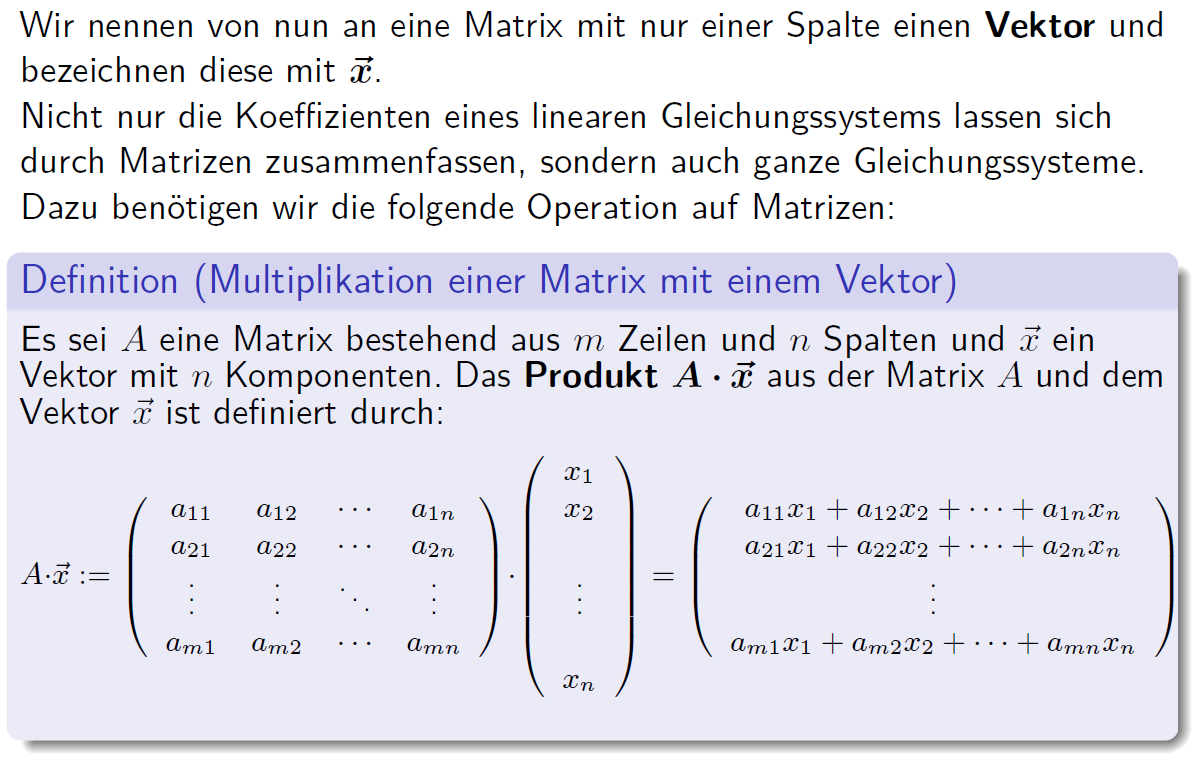
### Matrixdarstellung

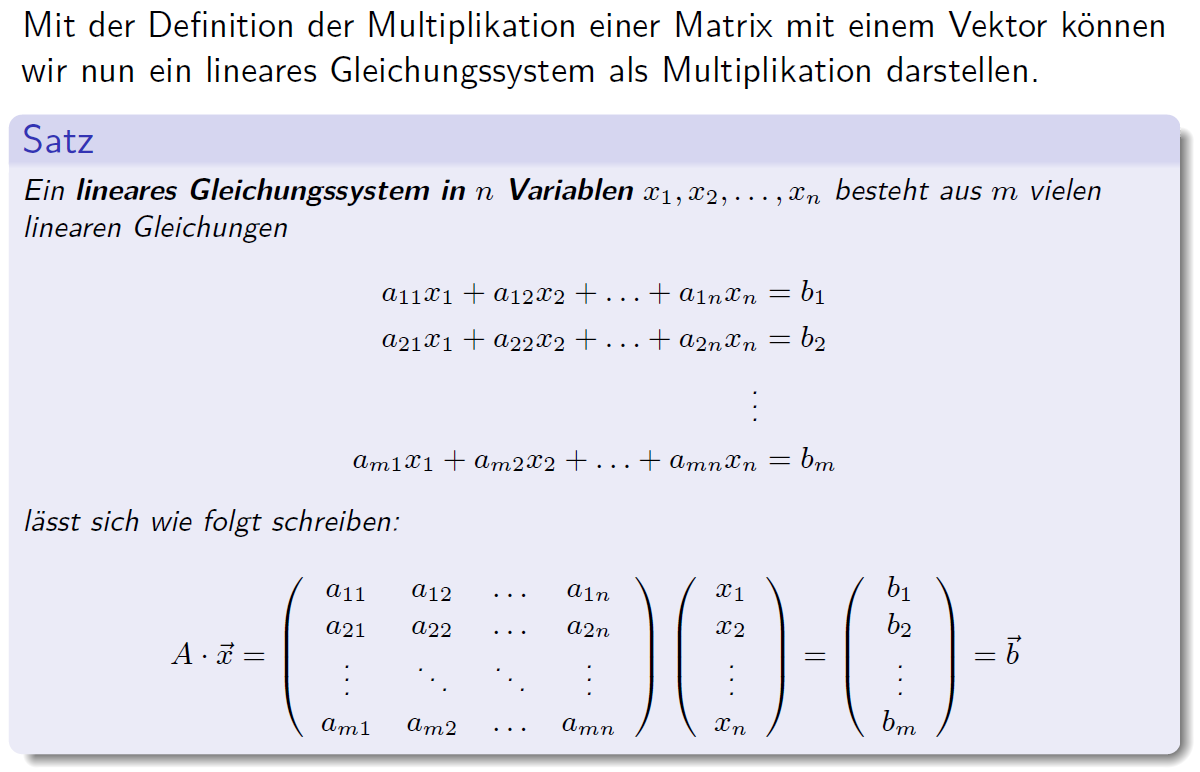






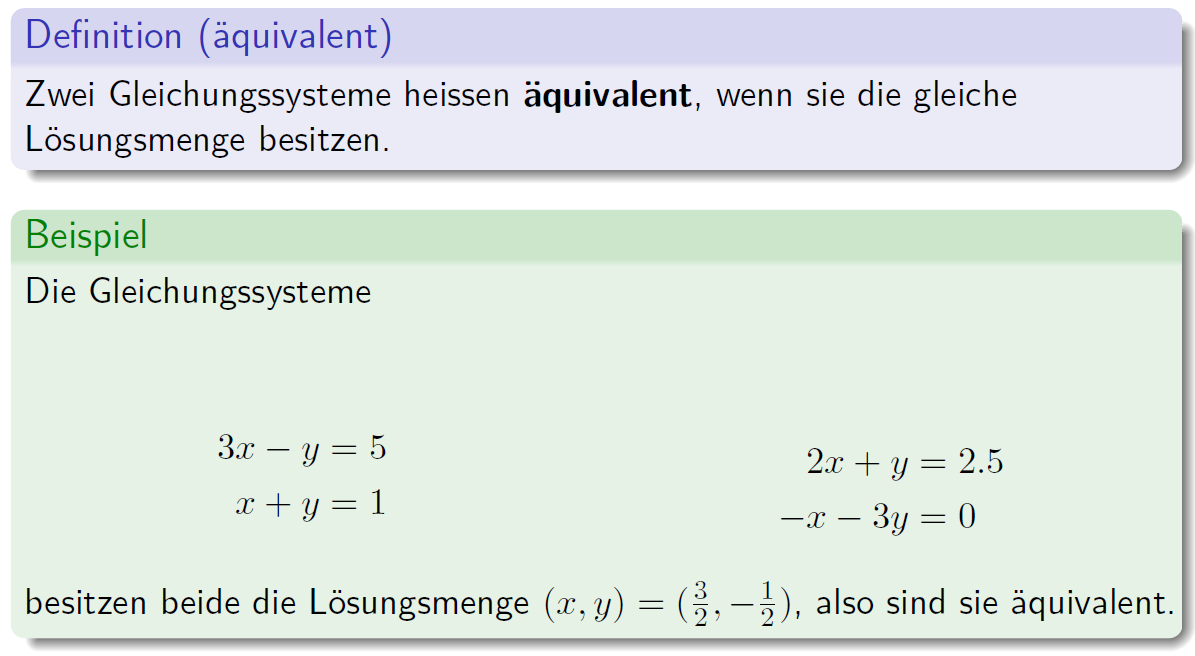
### Multiplikation einer Matrix mit einem Vektor



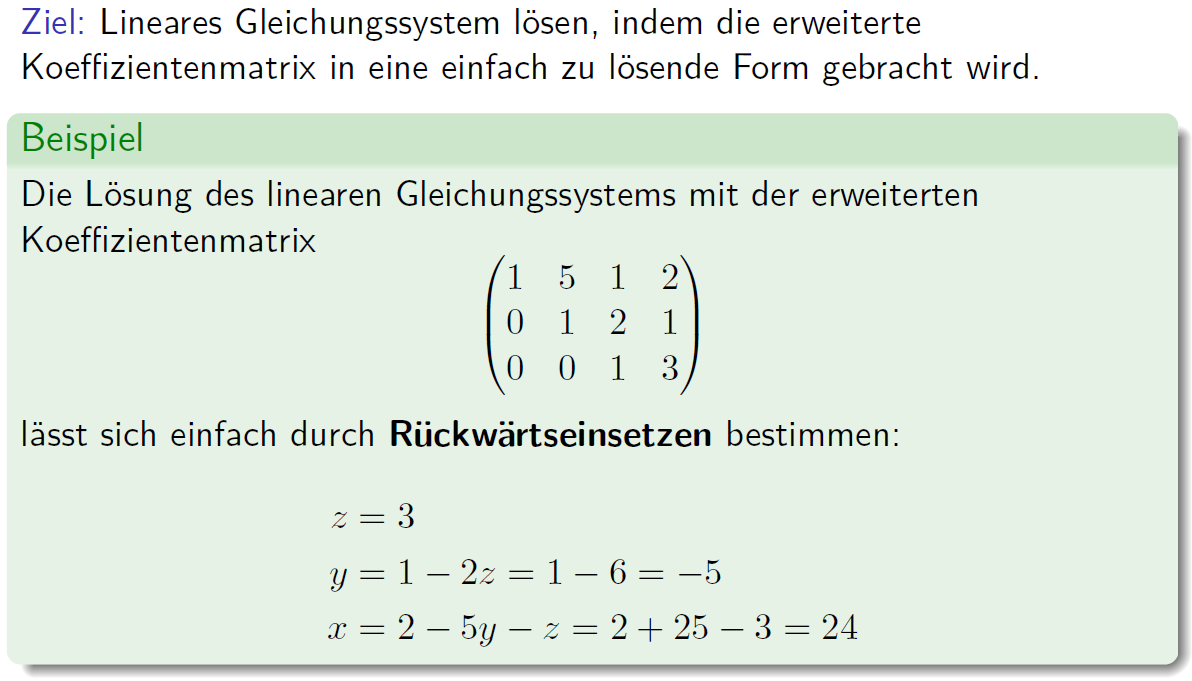


## Algorithmen zur Lösung linearer Gleichungssysteme

### Äquivalente Gleichungssysteme

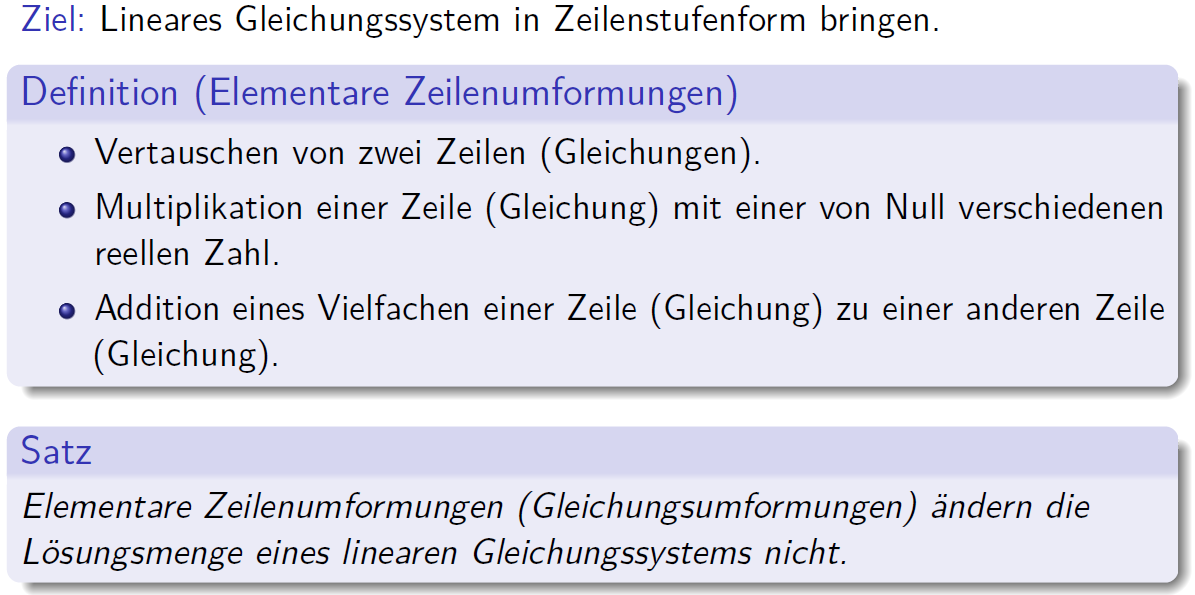


### Zeilenstufenform einer Matrix

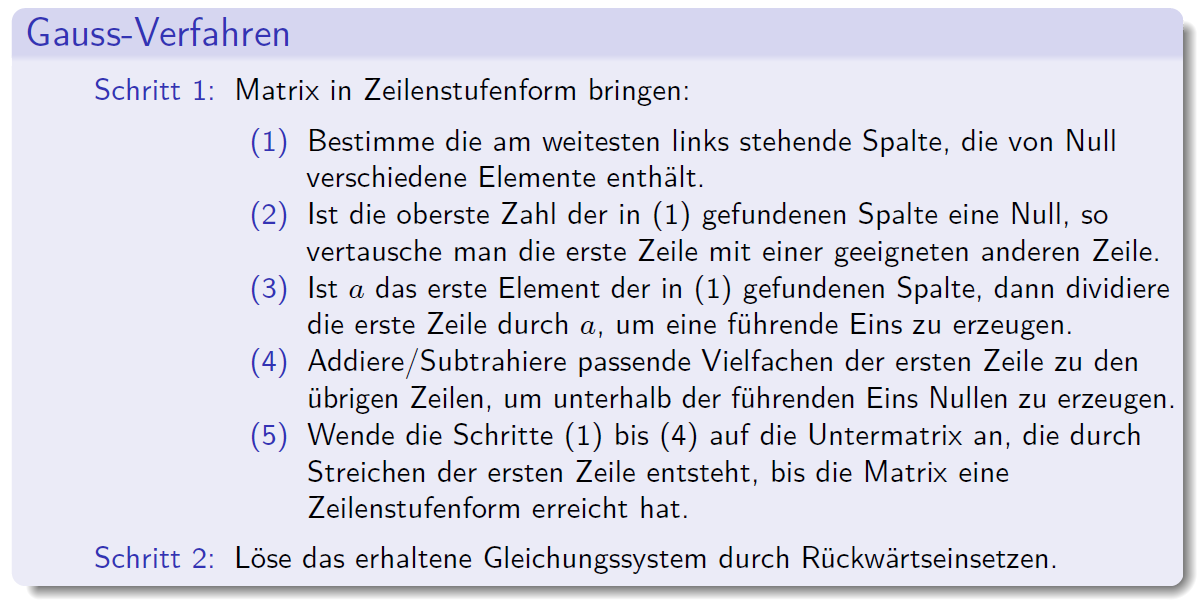


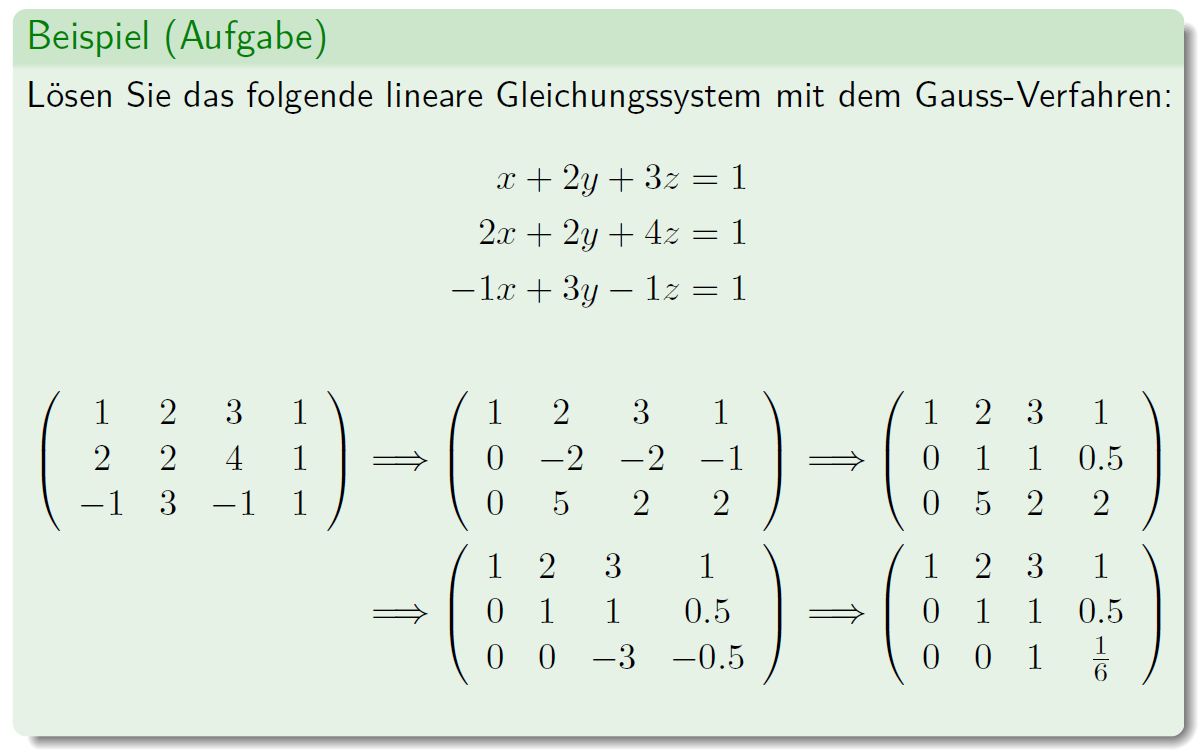


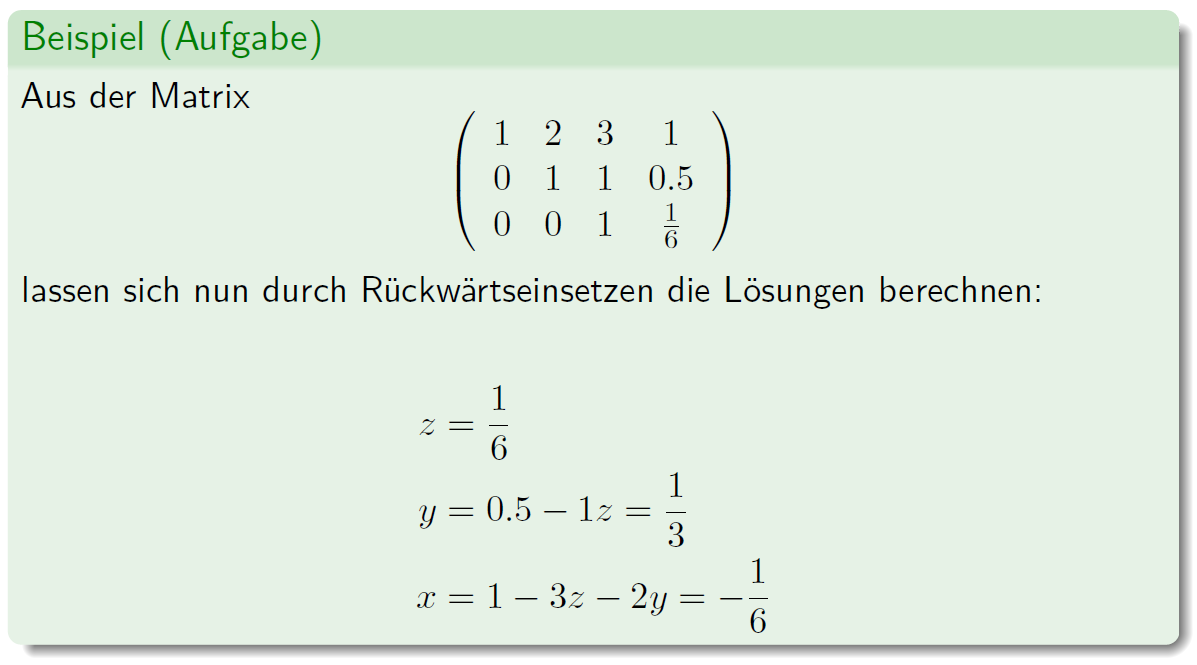
### Elementare Zeilenumformungen



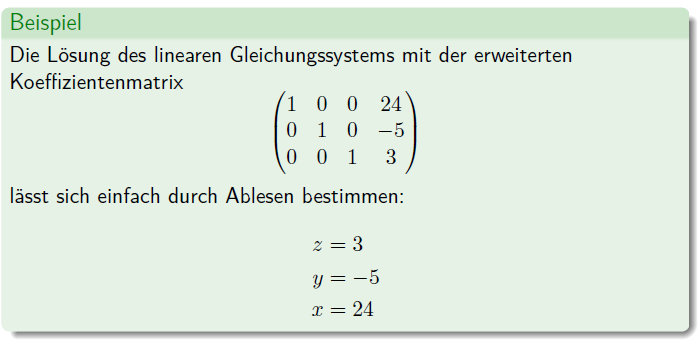
### Gauss Verfahren

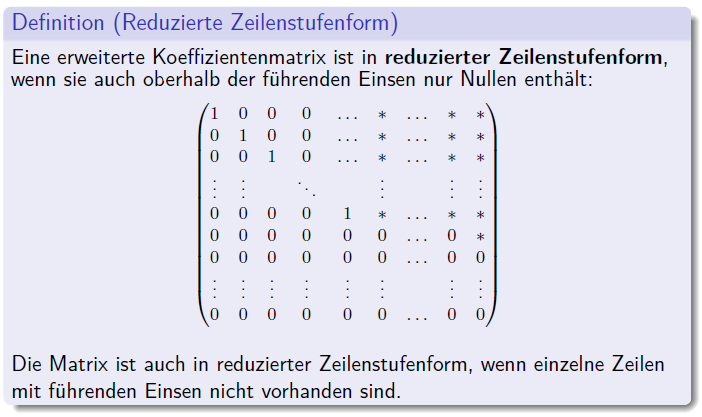


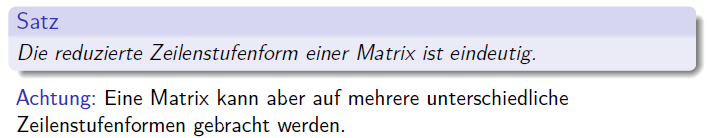




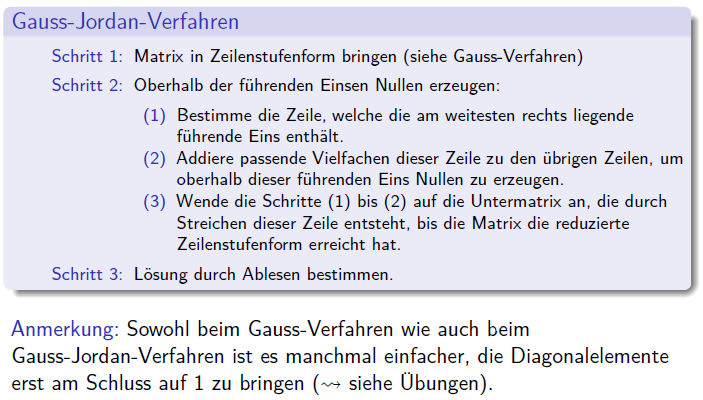
### Reduzierte Zeilenstufenform einer Matrix

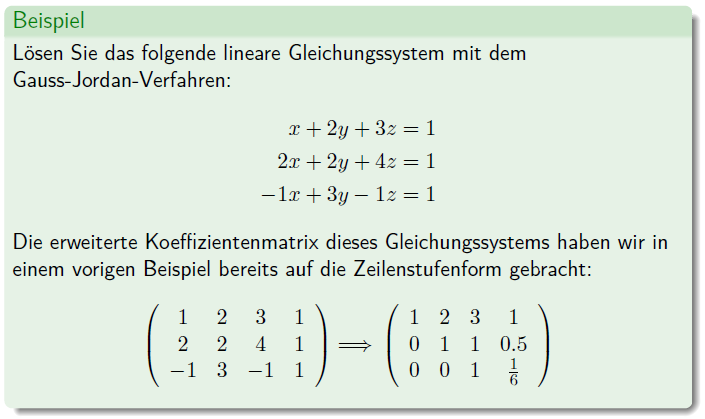






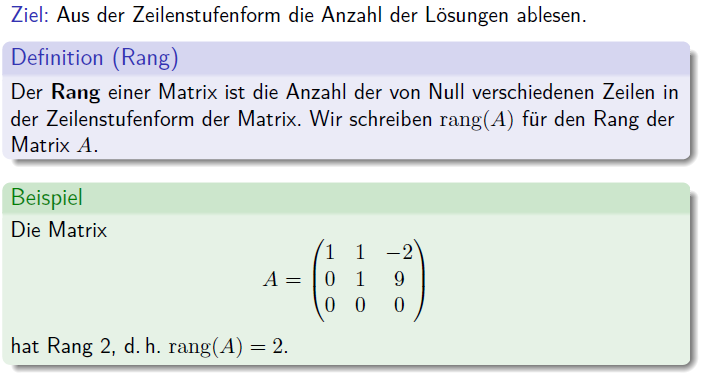
### Gauss-Jordan Verfahren





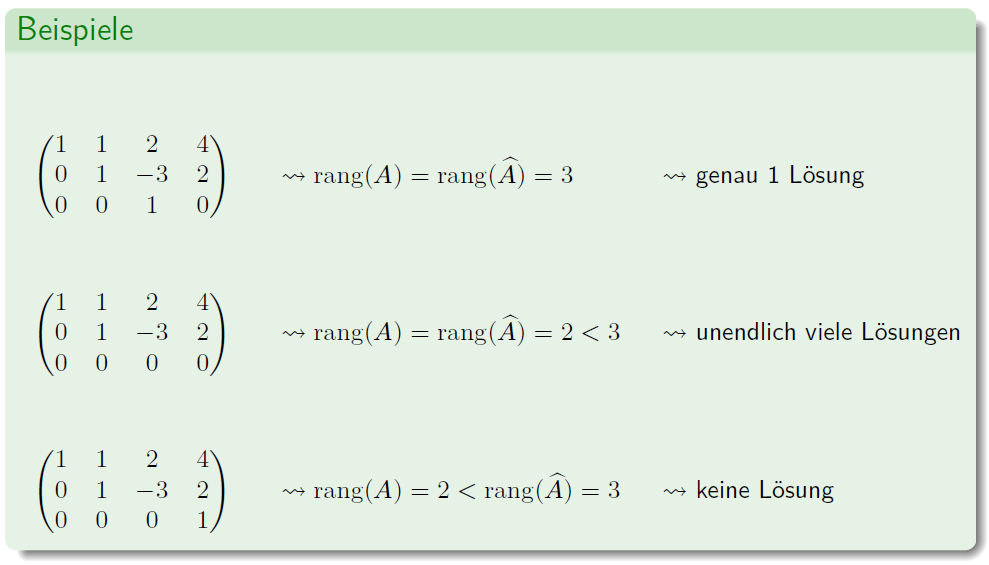


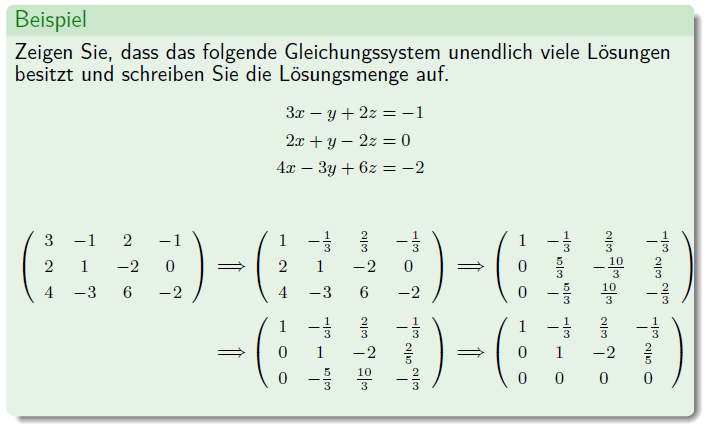
### Rang einer Matrix

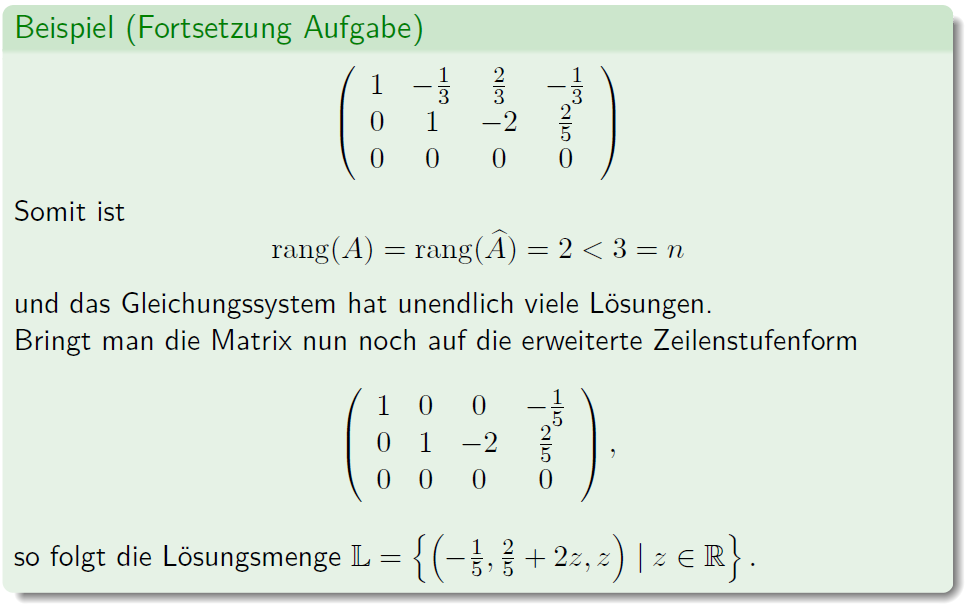


### Lösbarkeitskriterien



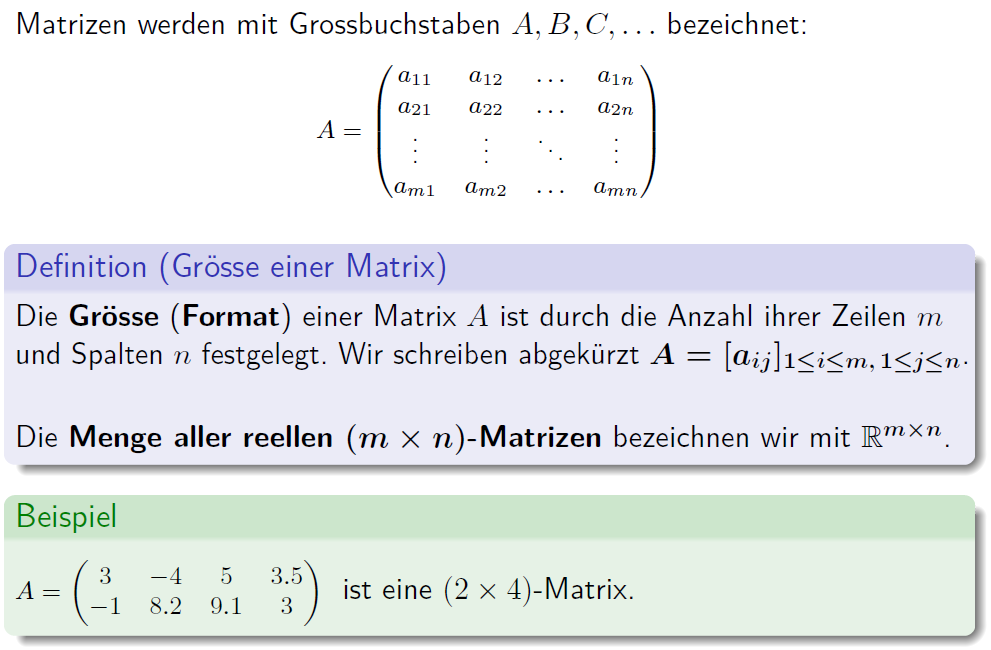




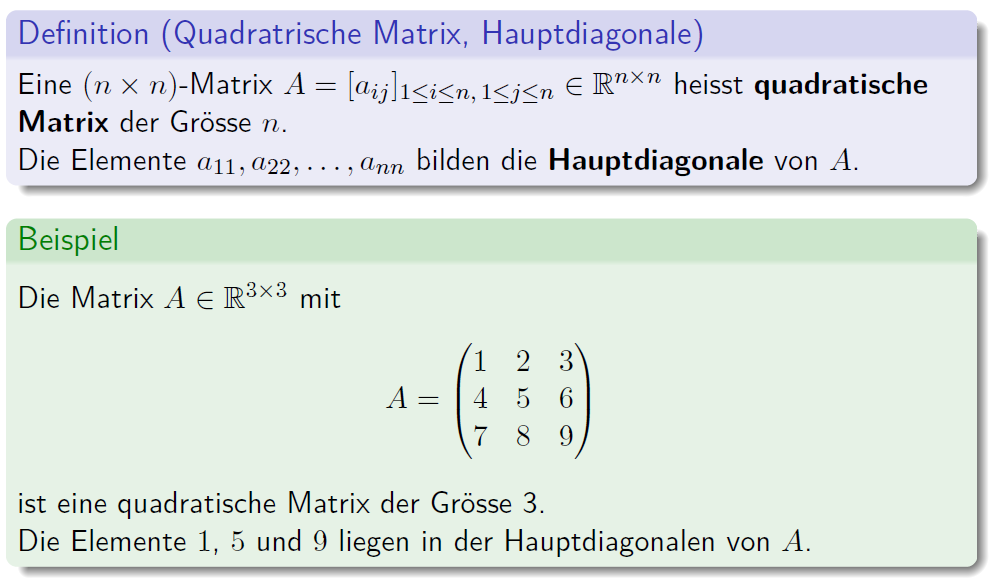


## Spezielle Matrizen

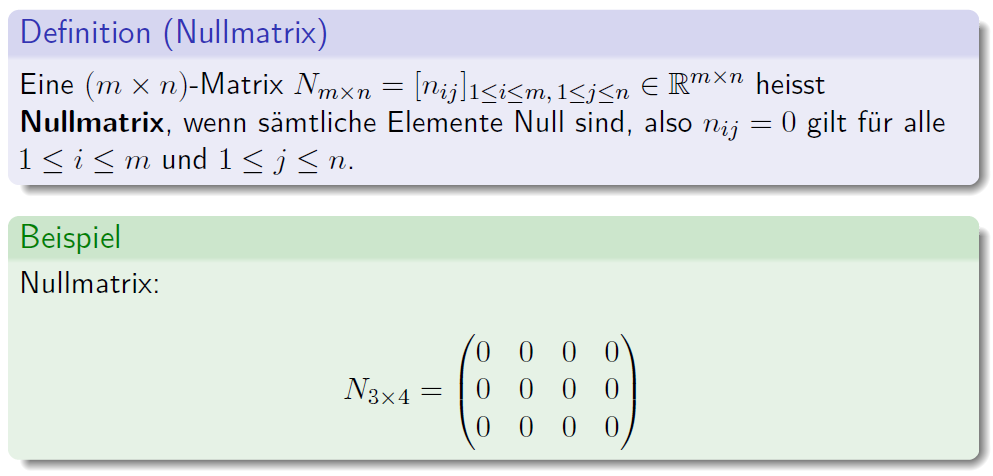
### Grösse von Matrizen



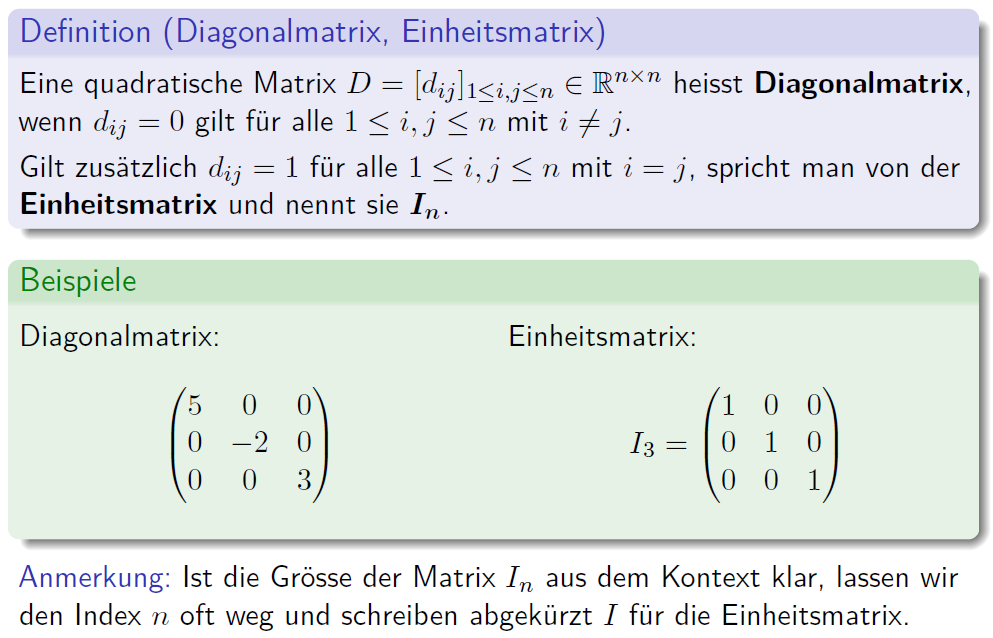
### Quadratische Matrix



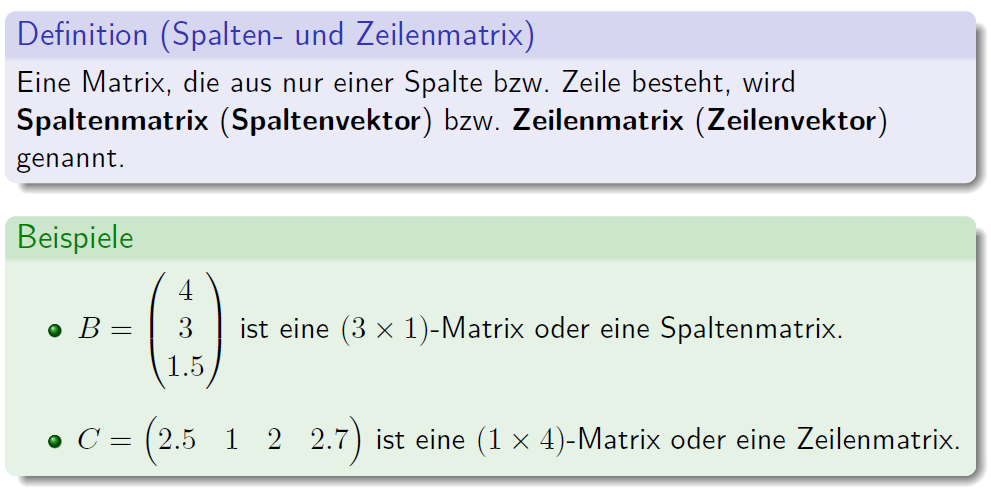
### Nullmatrix



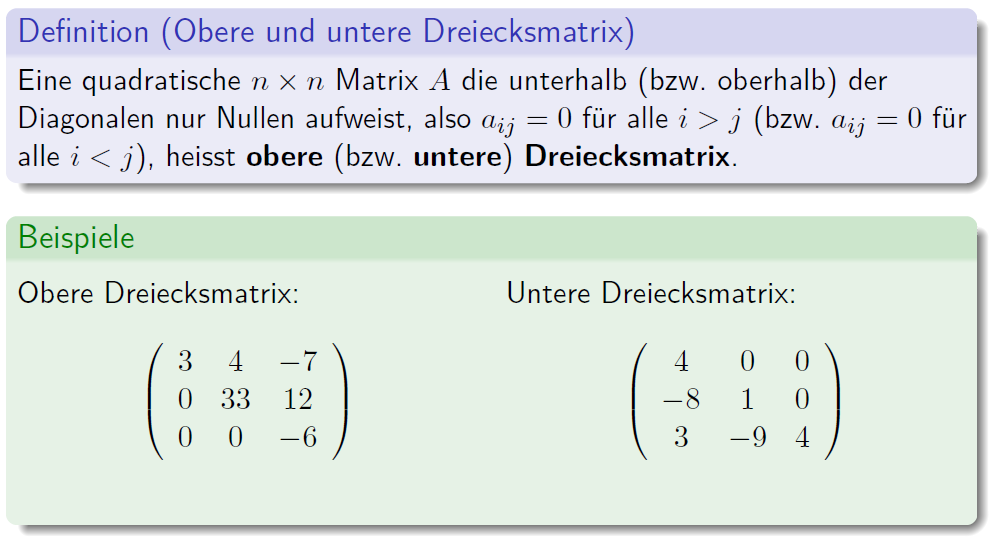
### Diagonal- und Einheitsmatrix



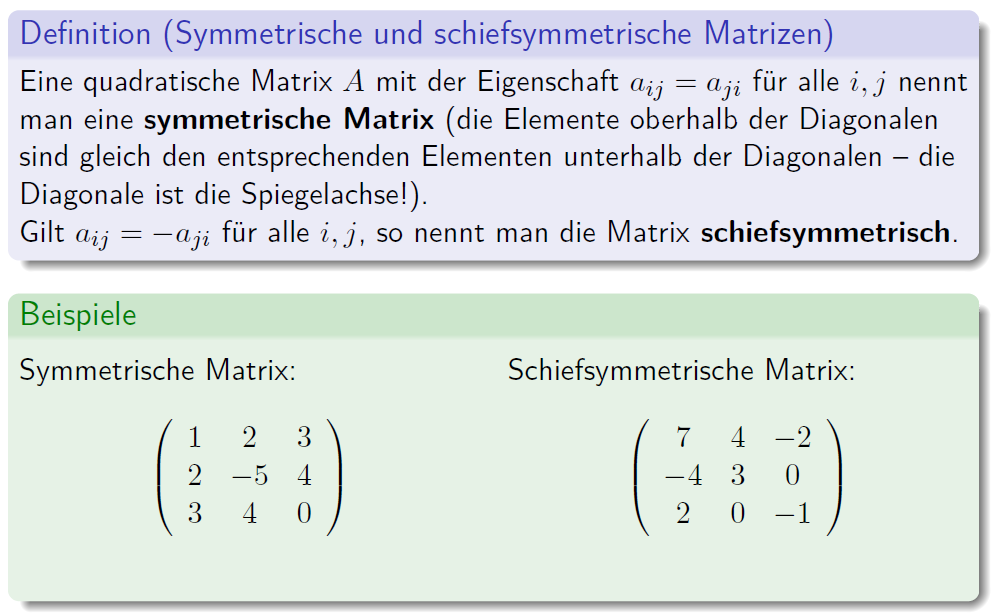
### Spalten- und Zeilenmatrix



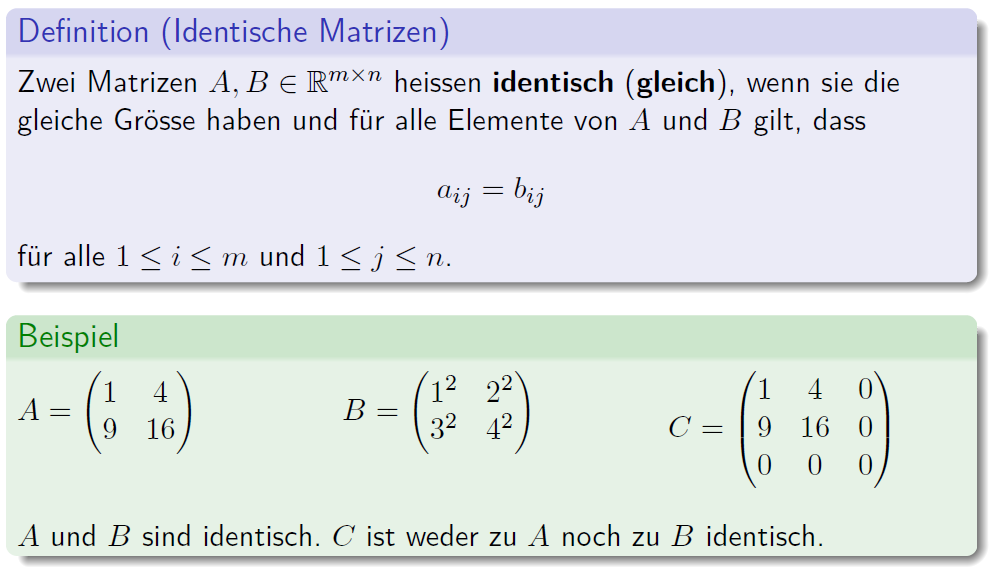
### Dreiecksmatrix



### Symmetrische und schiefsymmetrische Matrizen

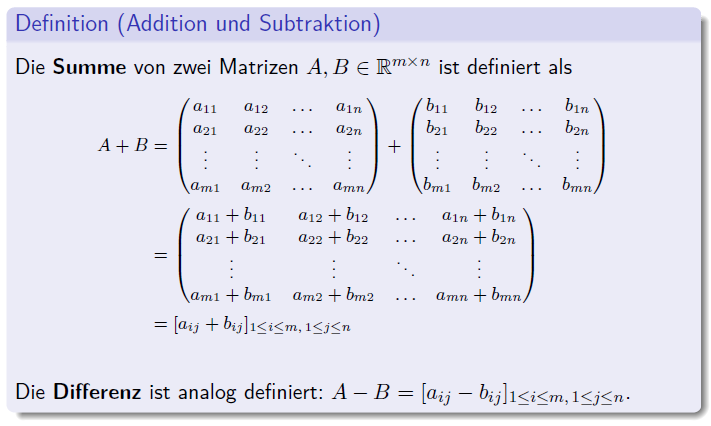


### Gleichheit von Matrizen

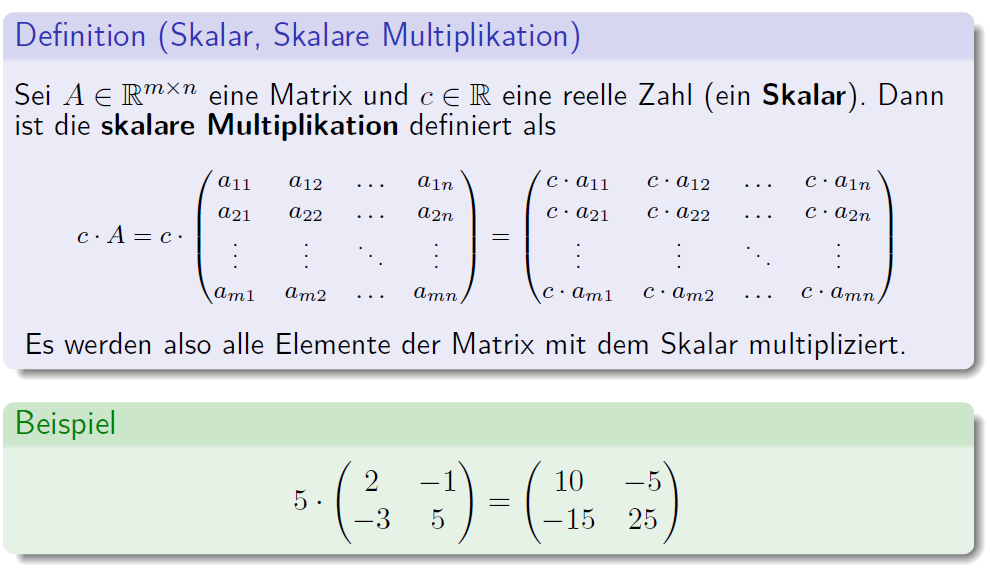


## Operationen auf Matrizen

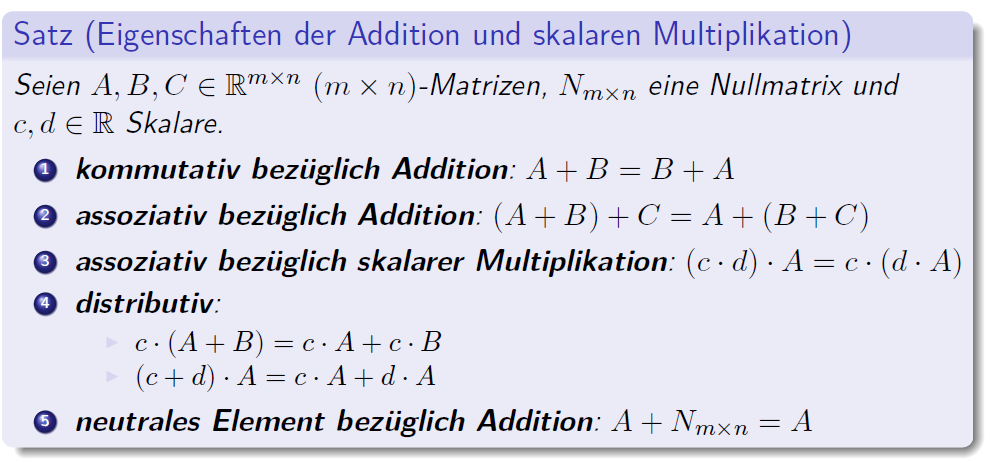
### Addition und Subtraktion von Matrizen



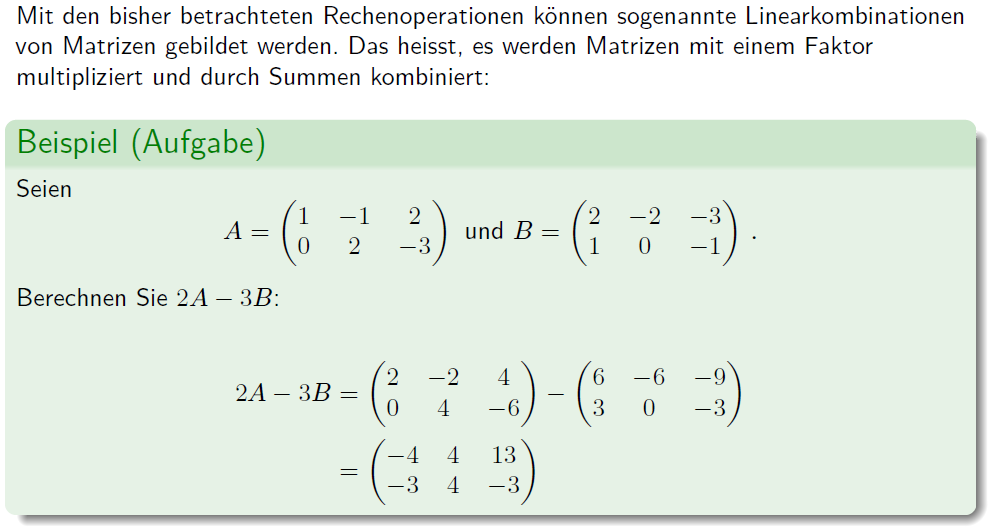
### Skalare Multiplikation

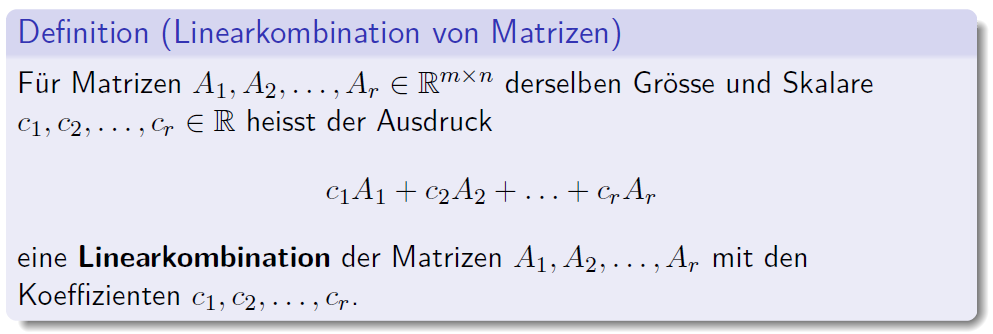


### Rechenregeln für die Addition und skalare Multiplikation

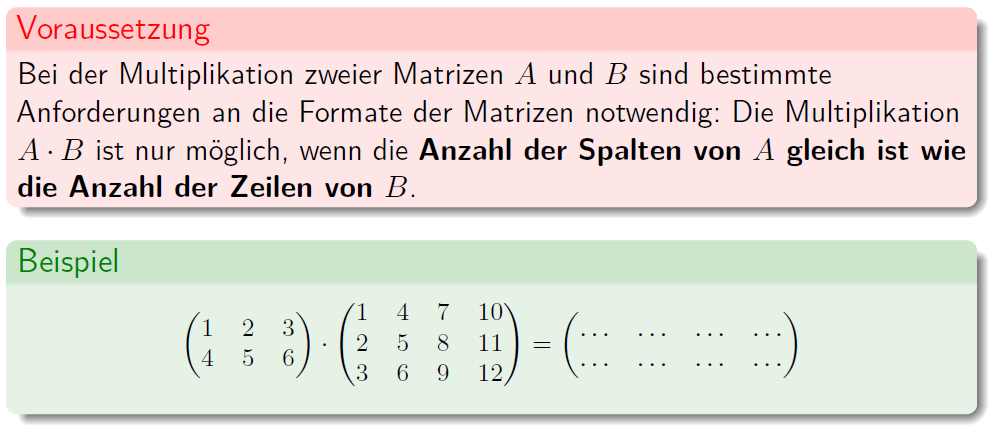


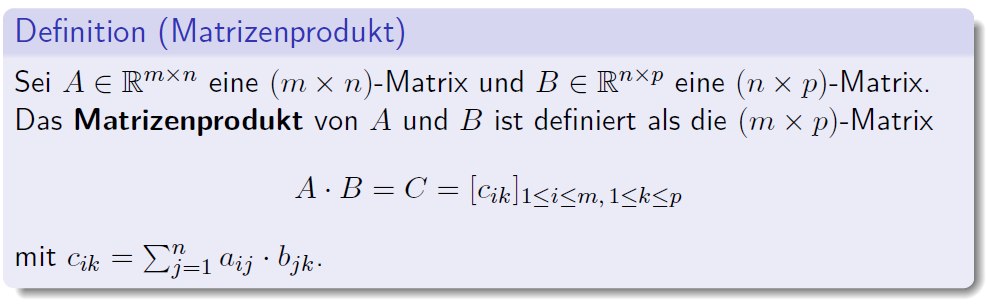
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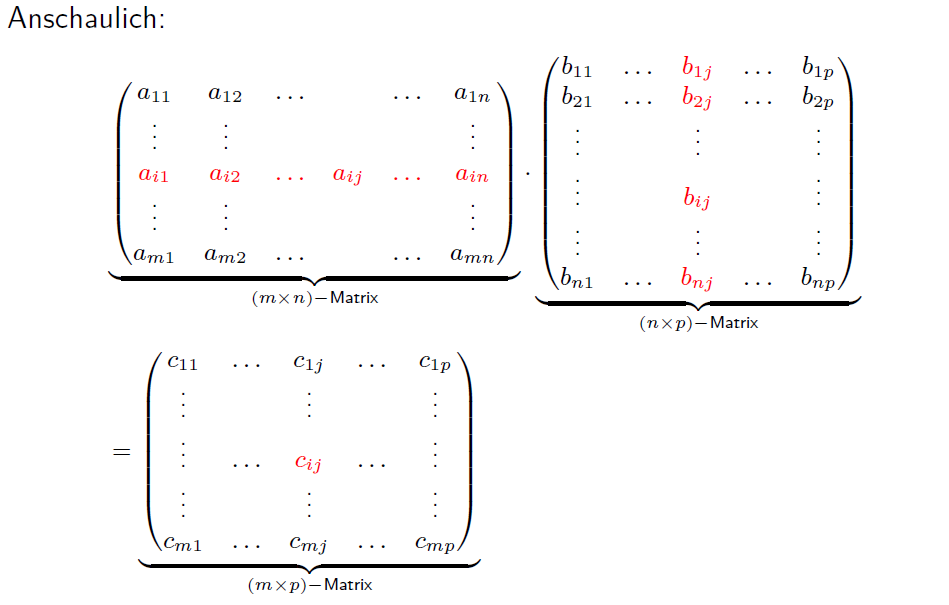


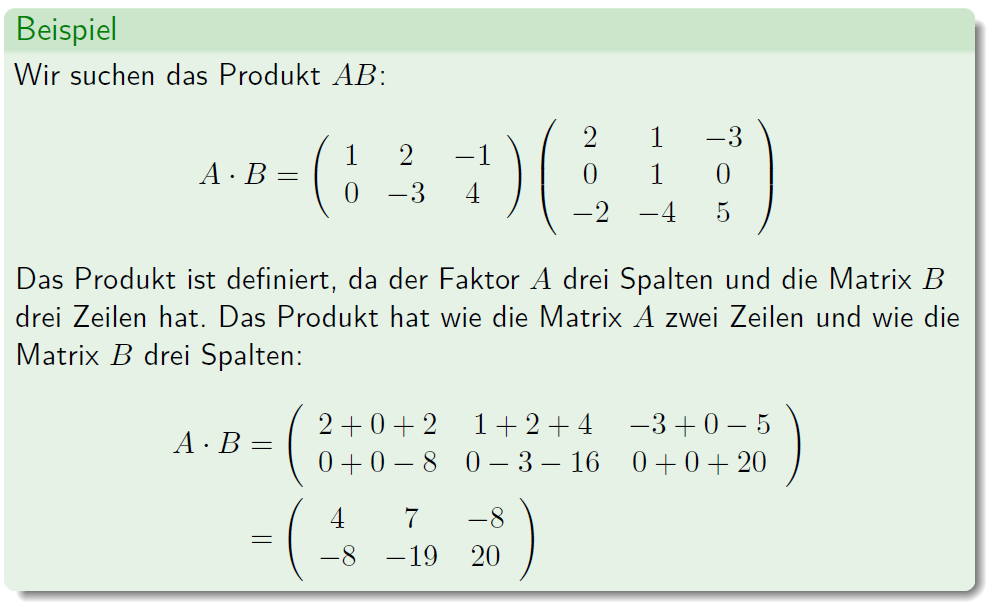


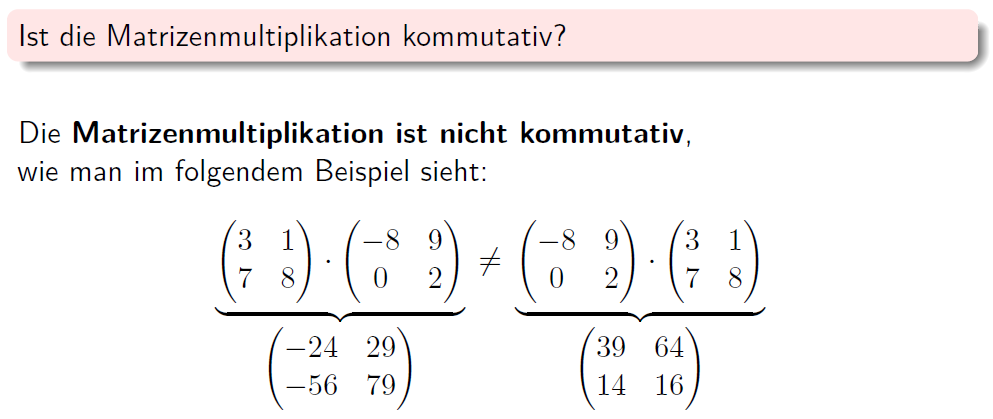
### Matrizenmultiplikation

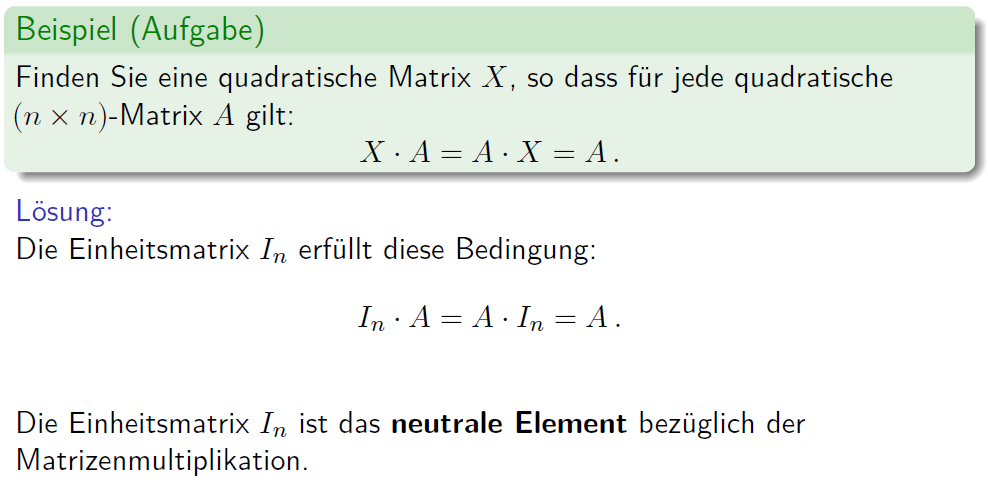




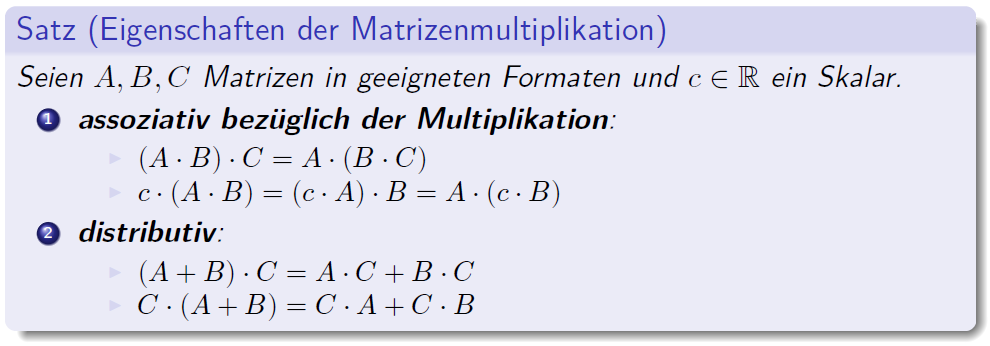


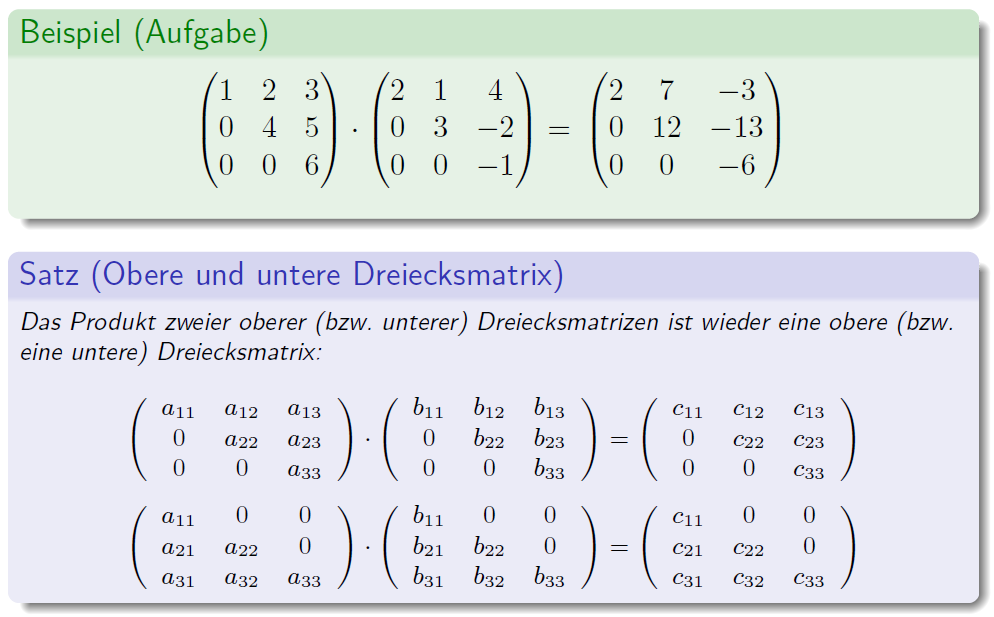




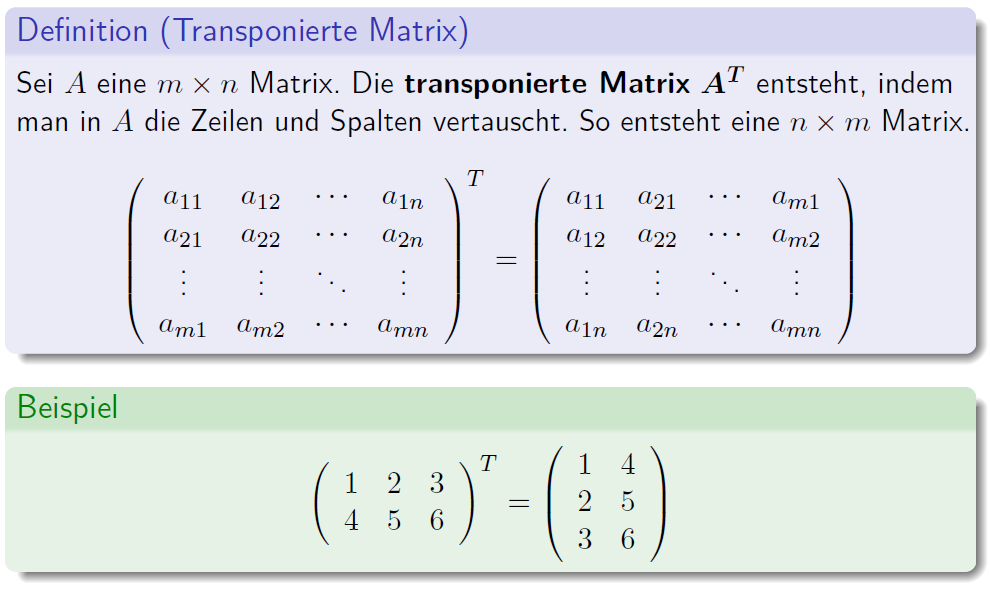


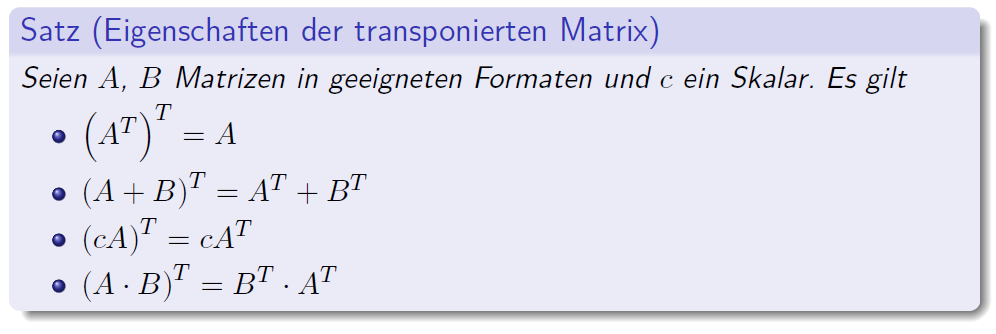
### Rechenregeln bei Matrizenmultiplikationen

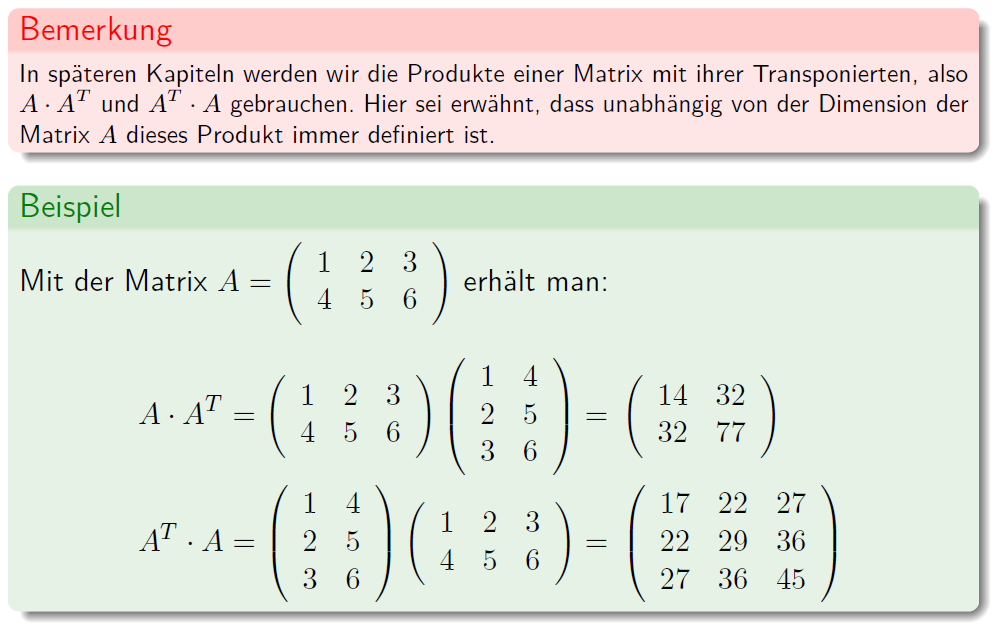




### Transponierte Matrix

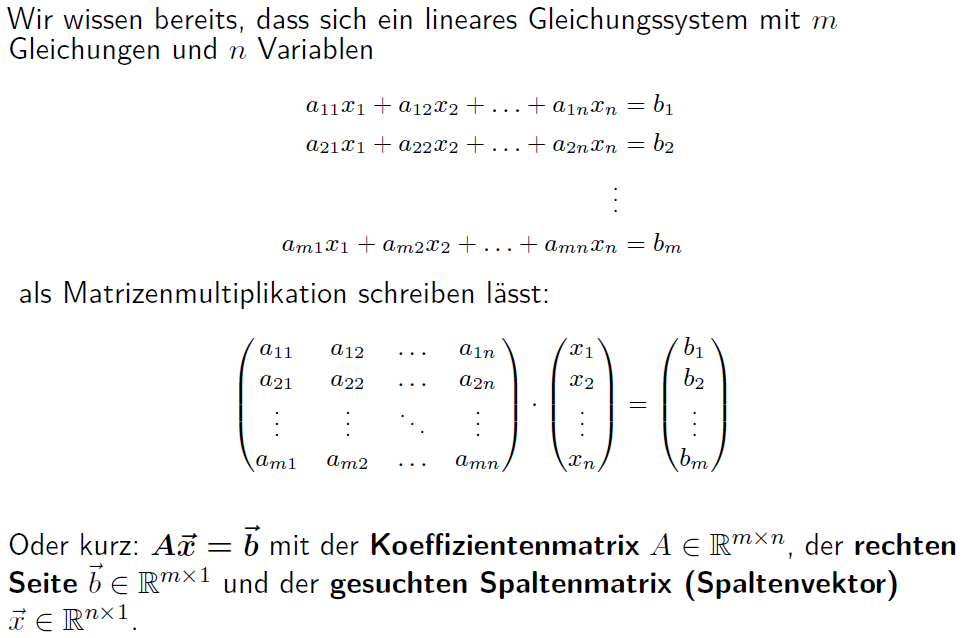


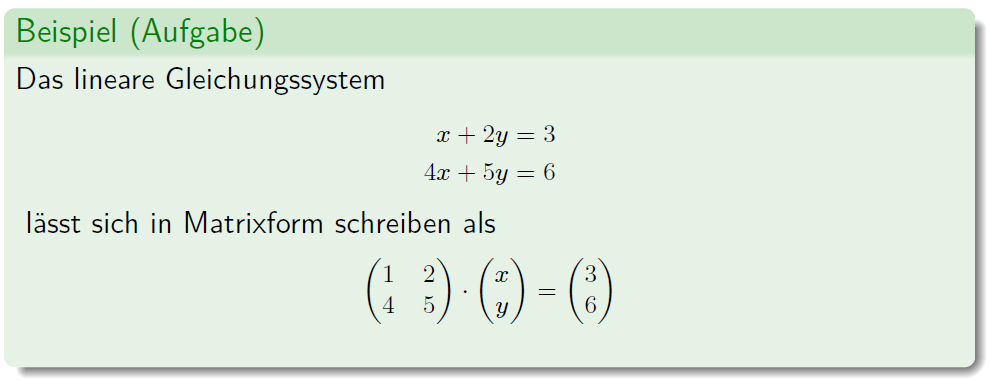


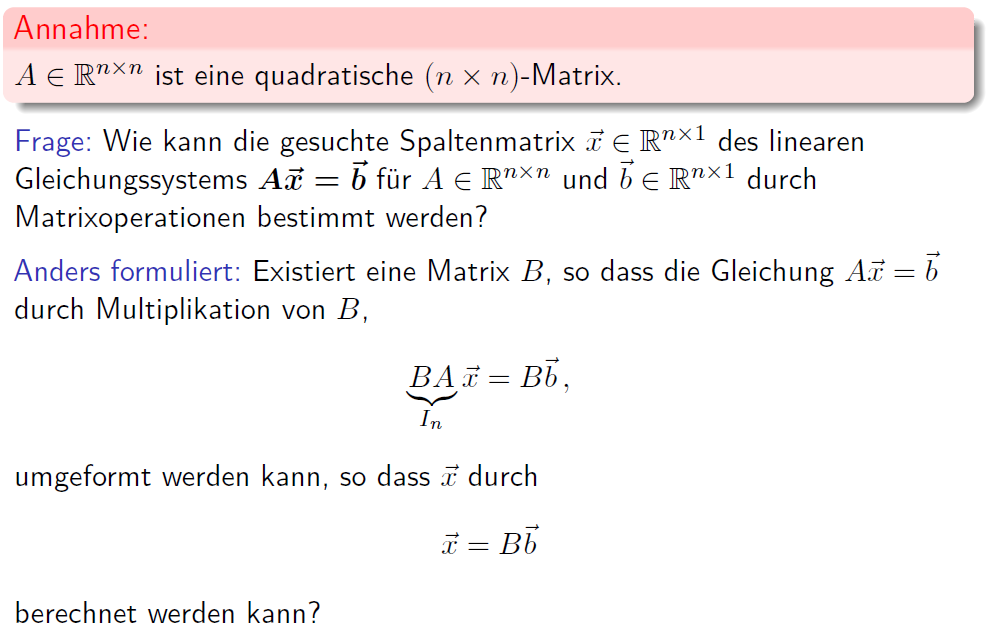


## Die Inverse einer Matrix

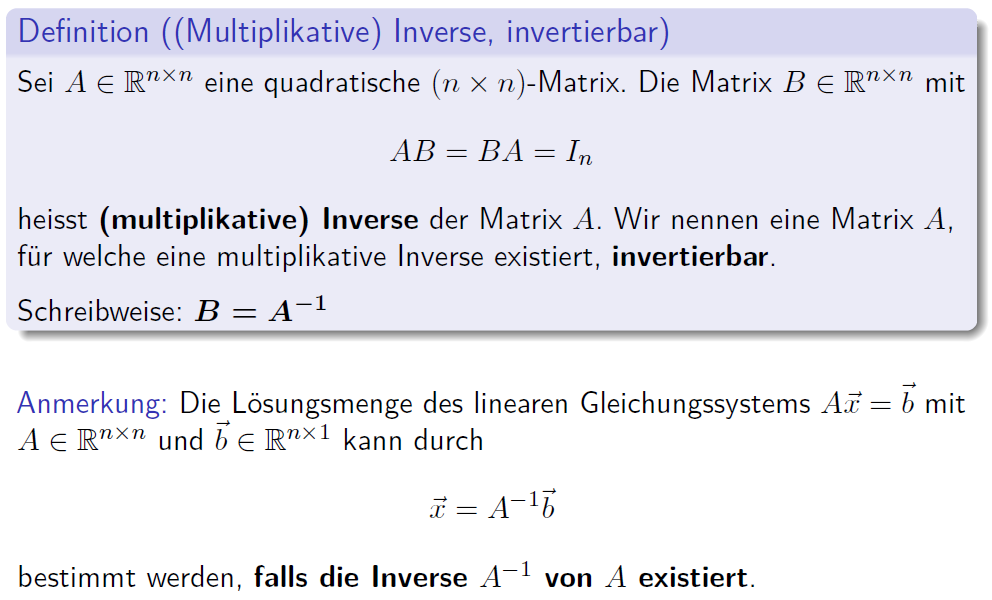
### Matrixform eines linearen Gleichungssystems



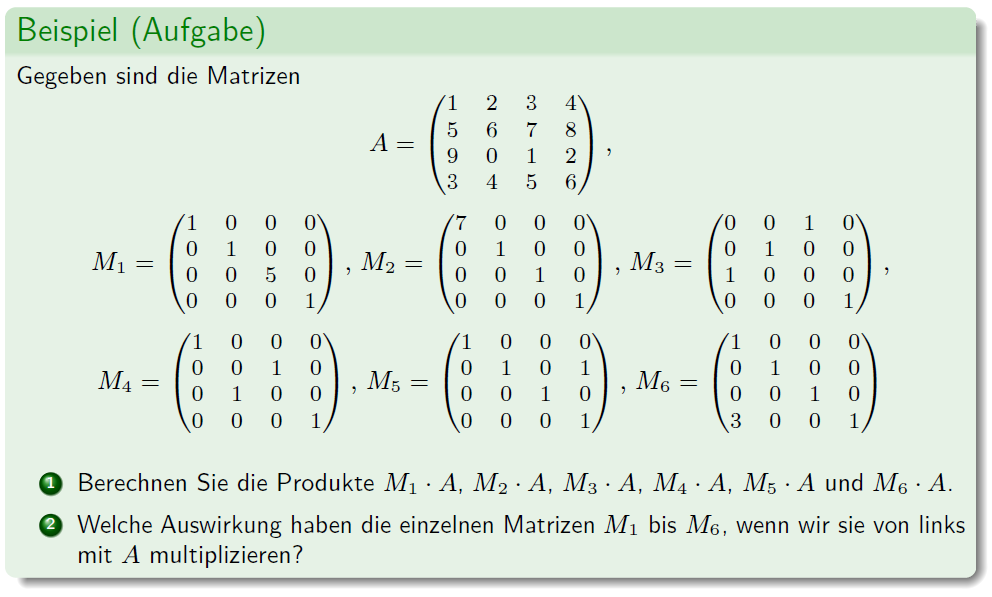


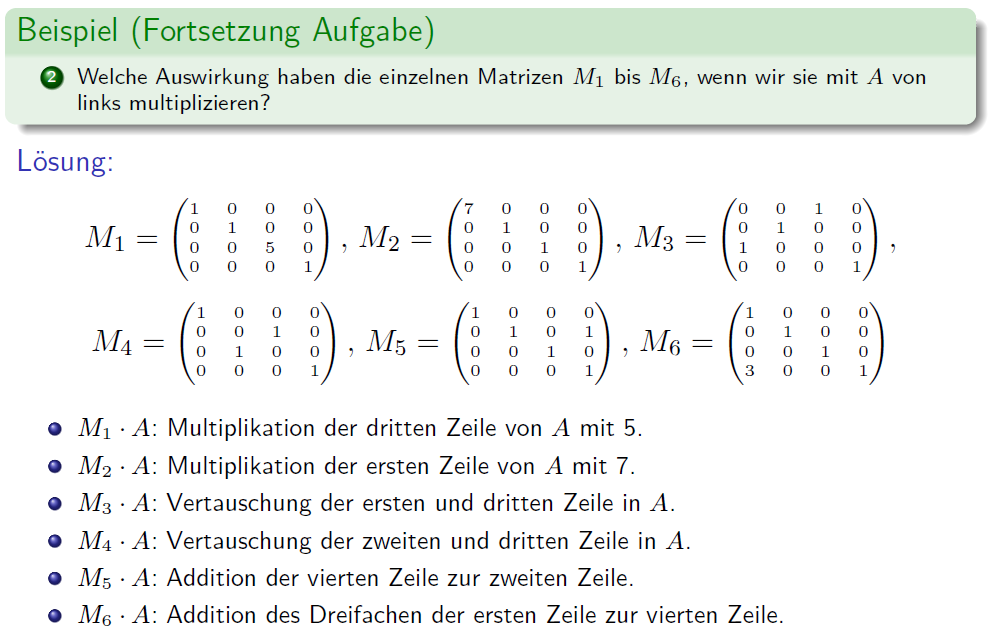


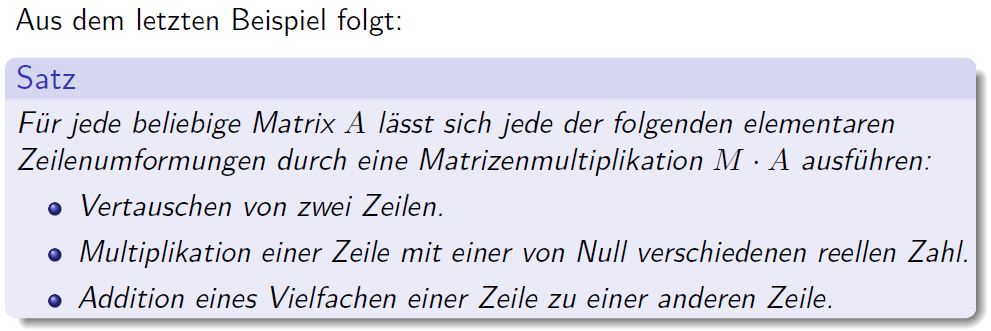
### Multiplikative Inverse

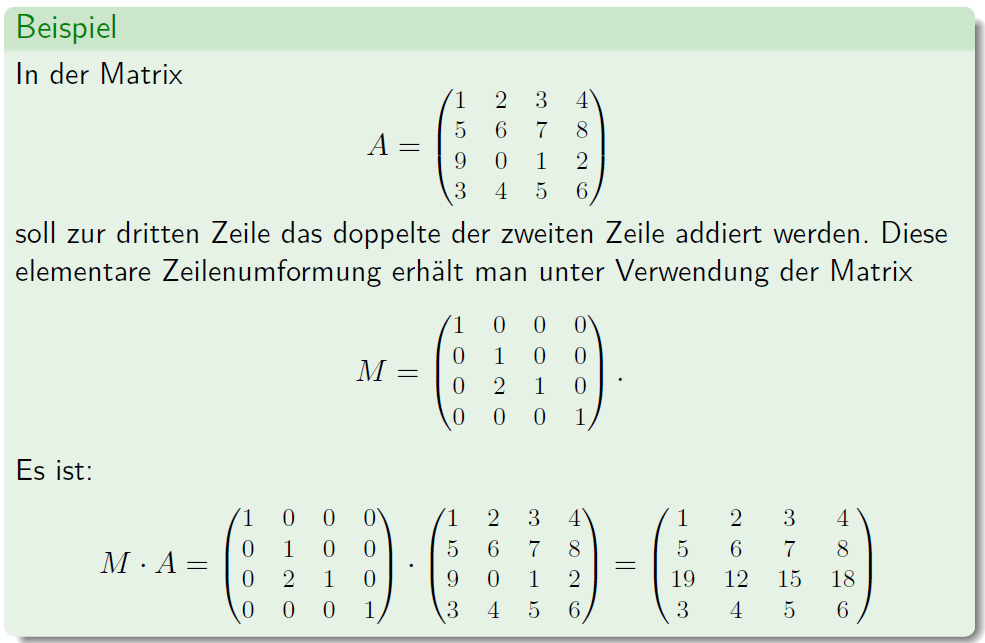


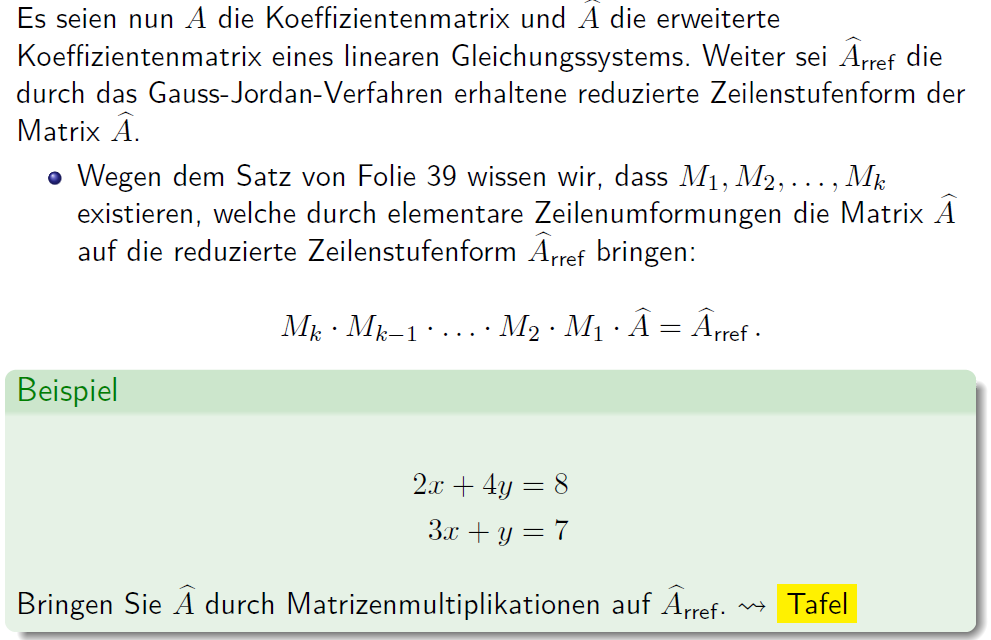
### Vorbereitung zur Berechnung der Inversen

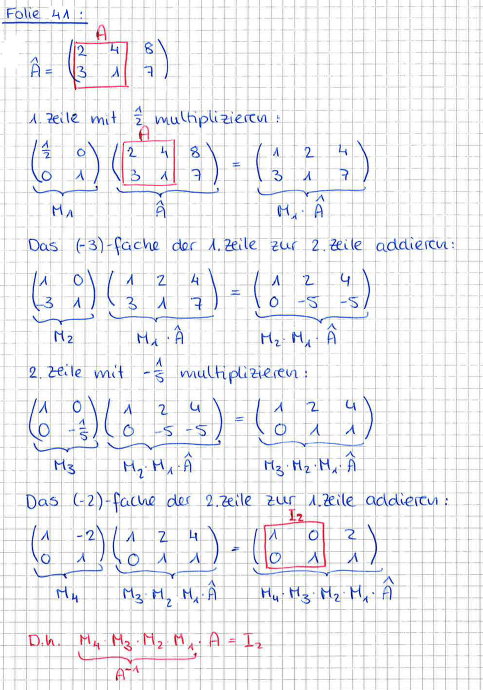


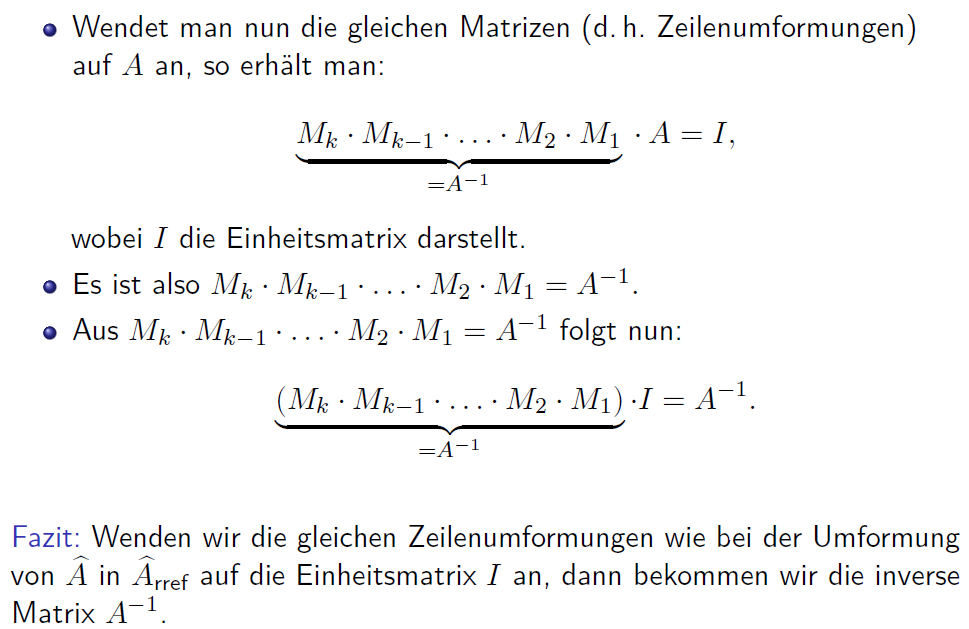


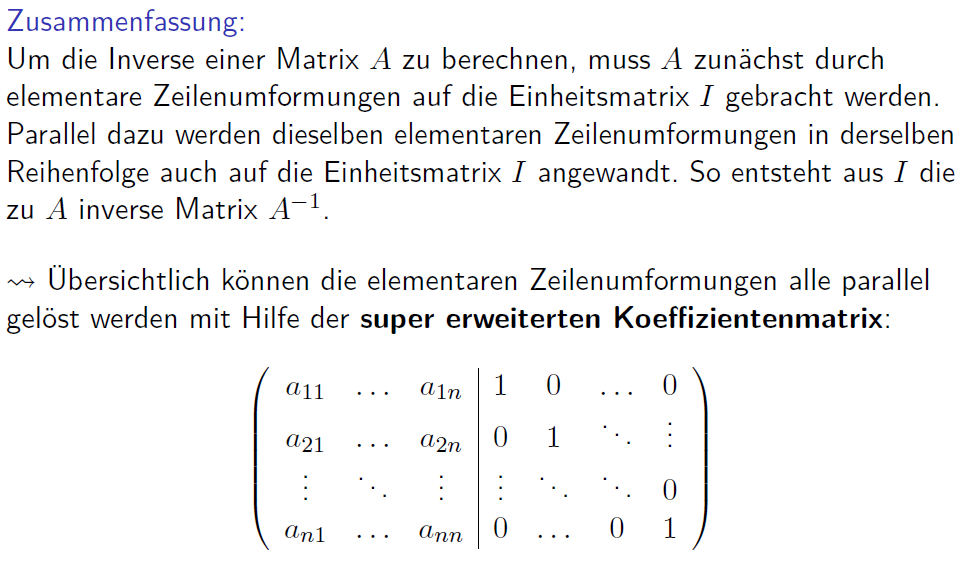




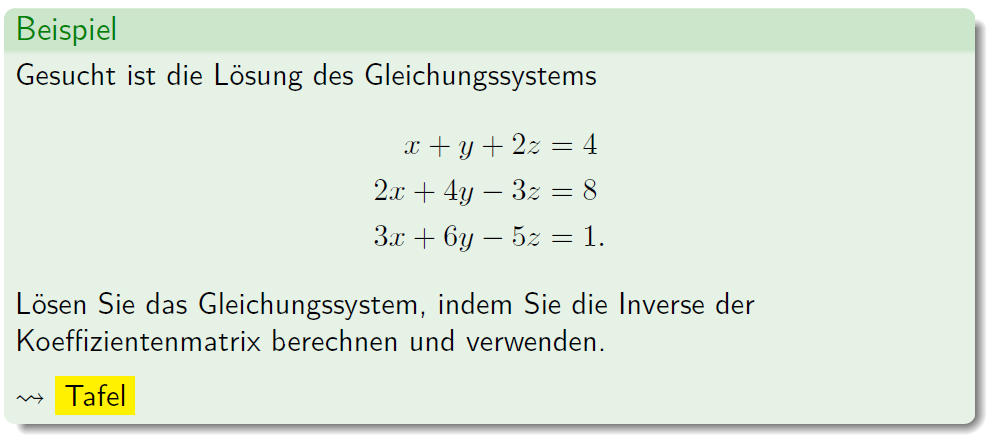


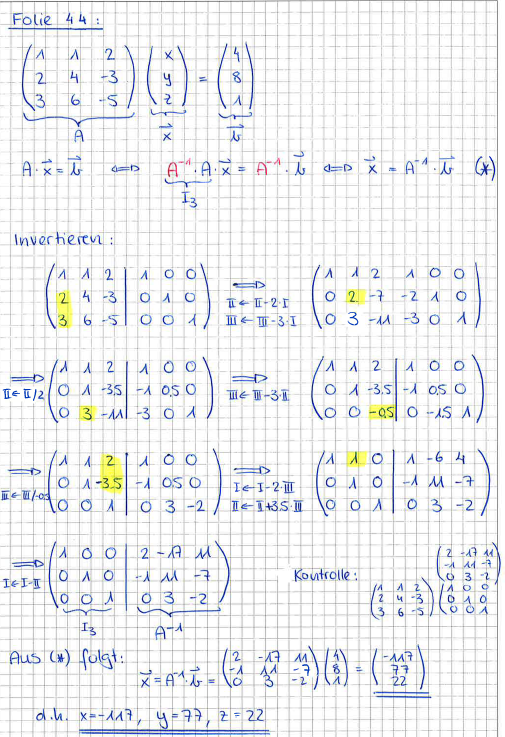




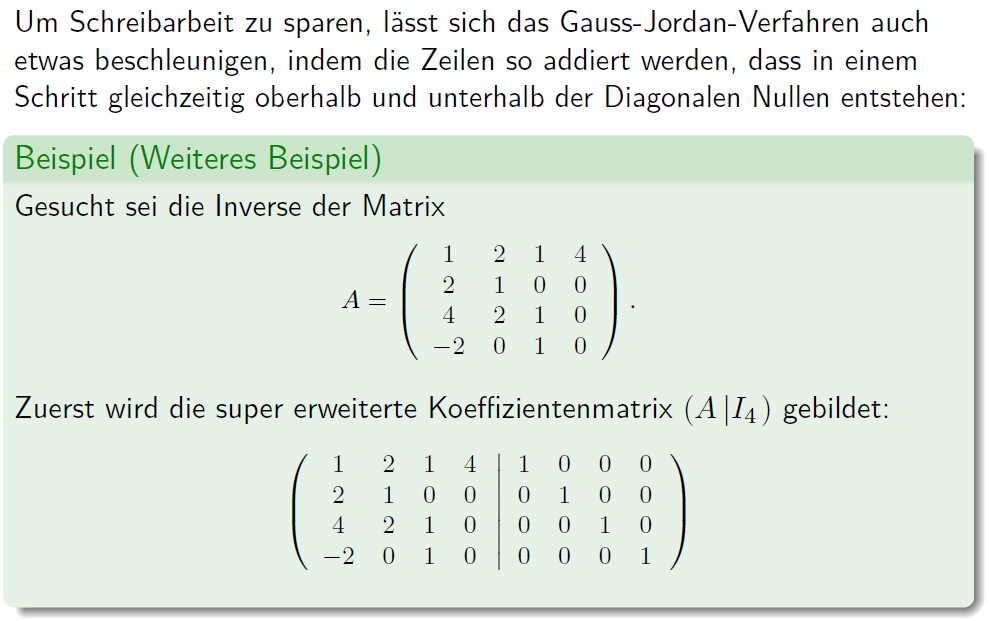


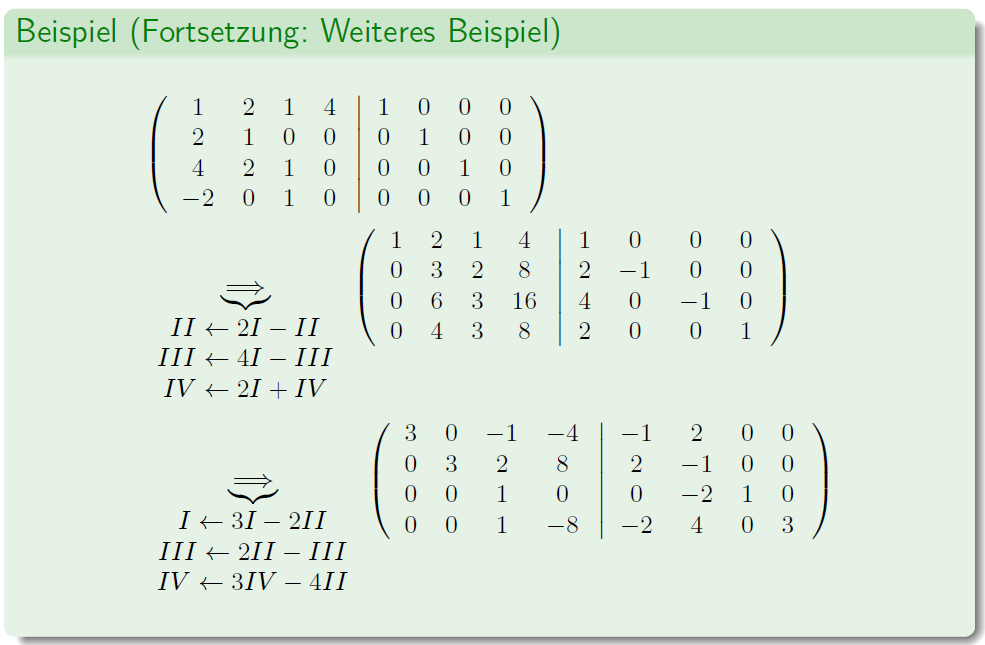
### Berechnung der Inversen

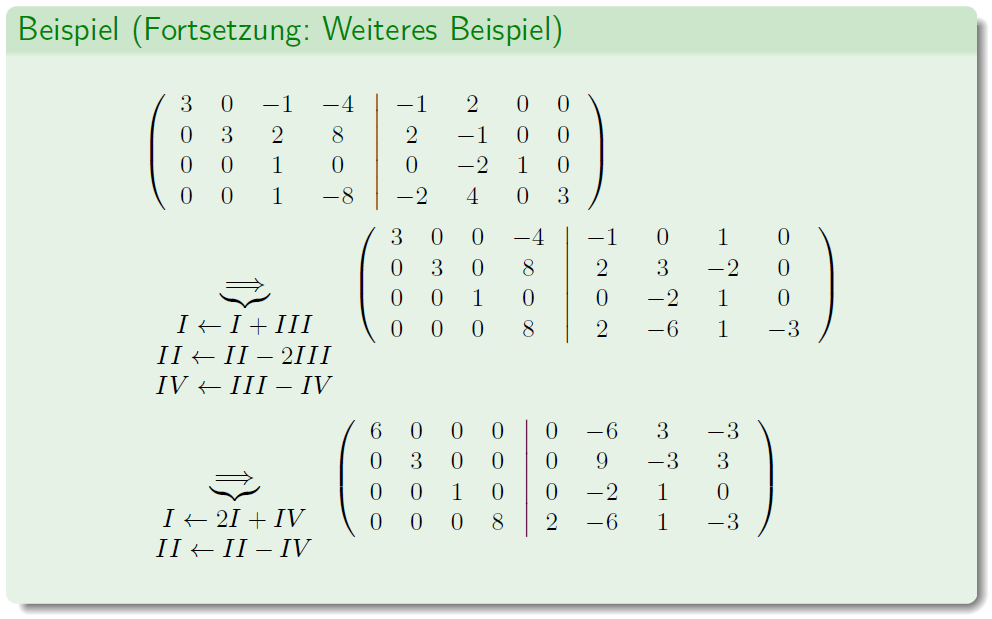


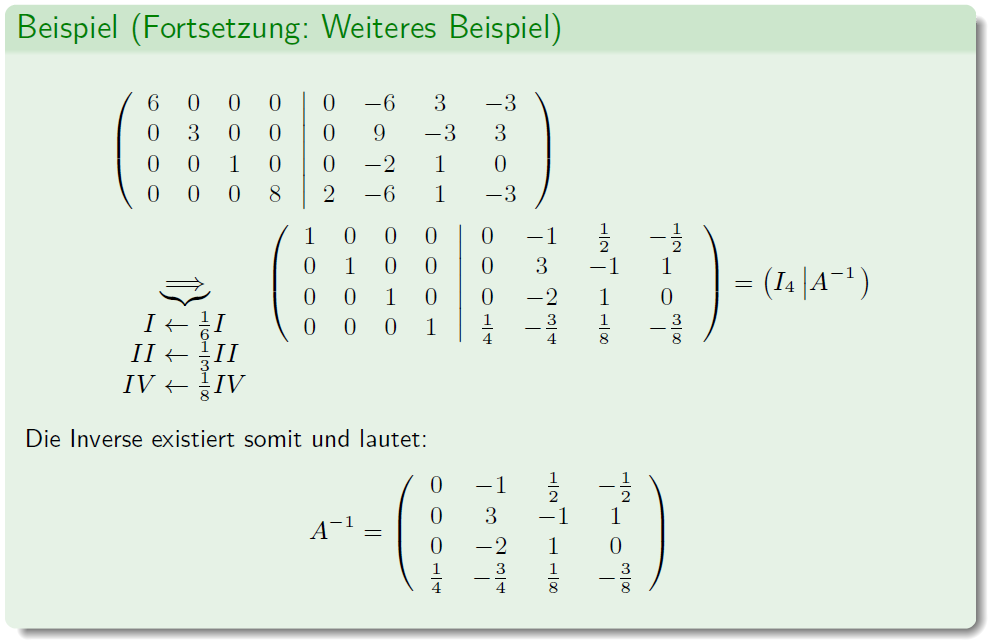




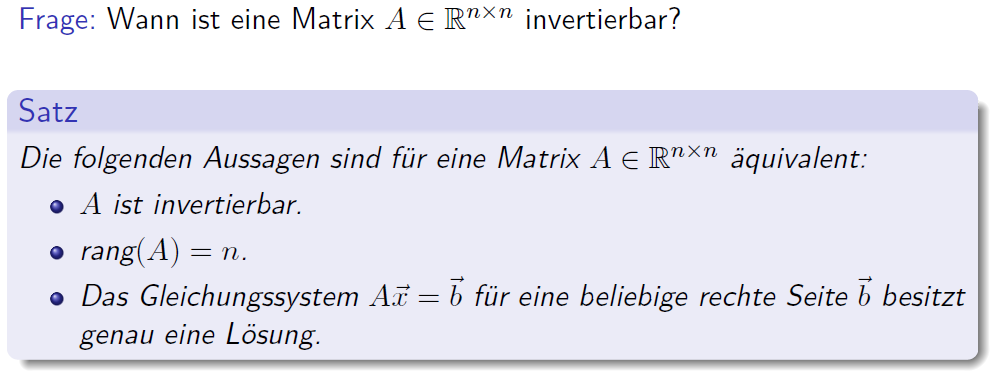




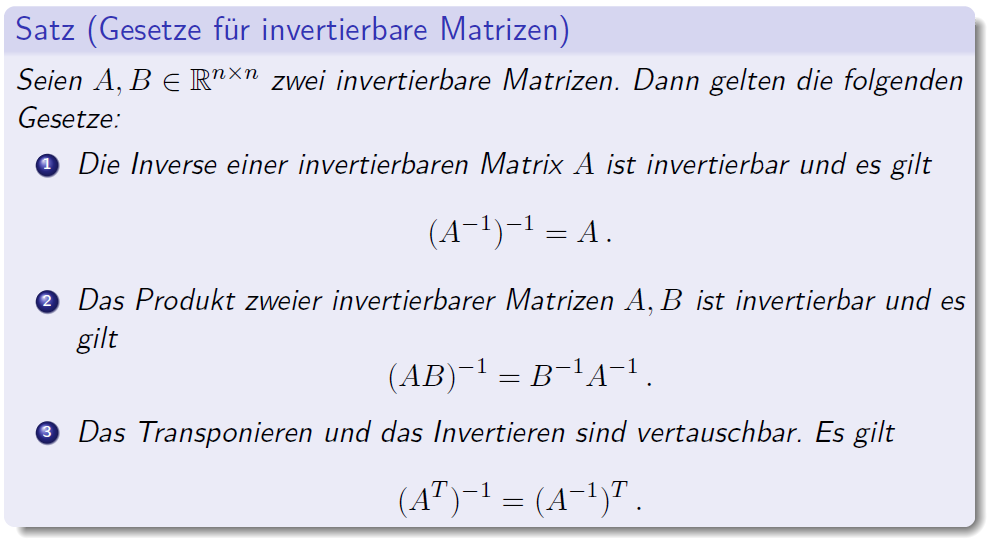




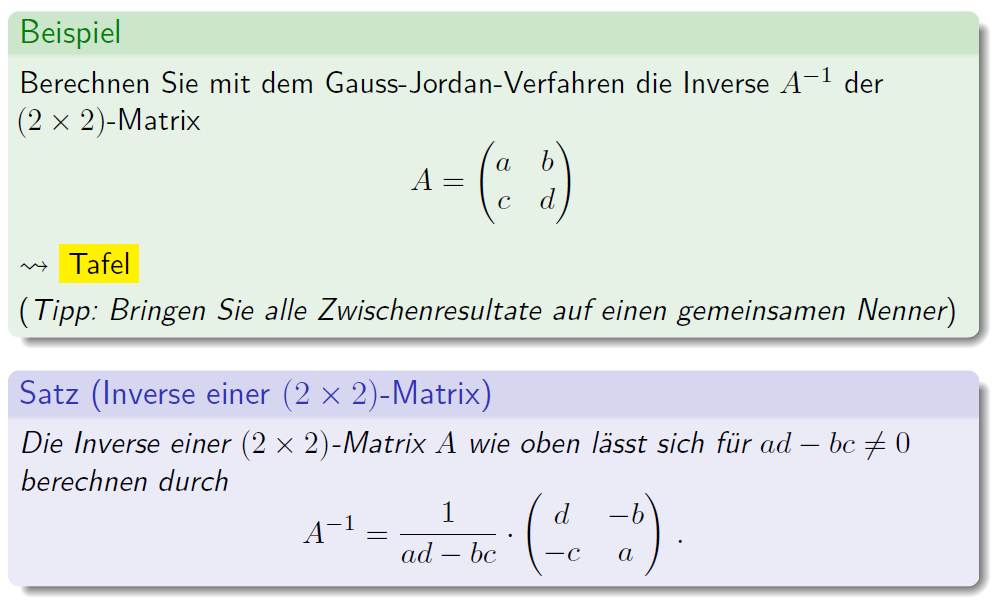
### Invertierbare Matrix



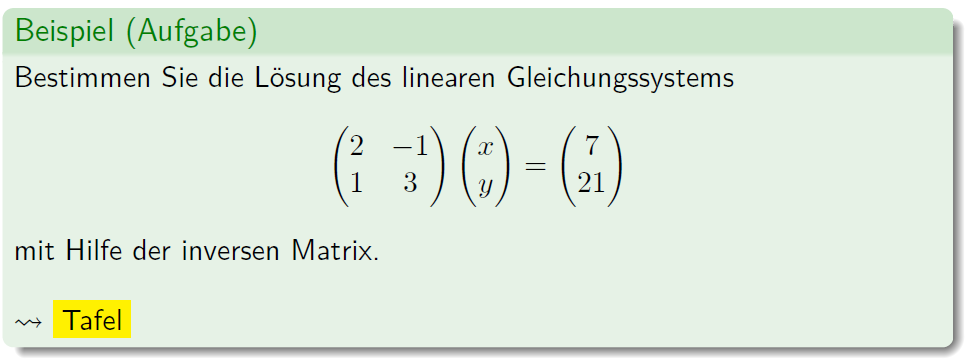
### Rechenregeln für invertierbare Matrizen

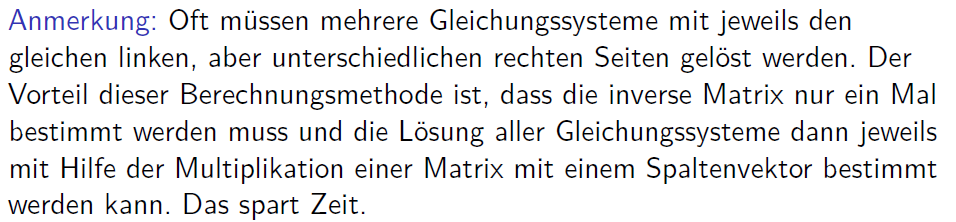


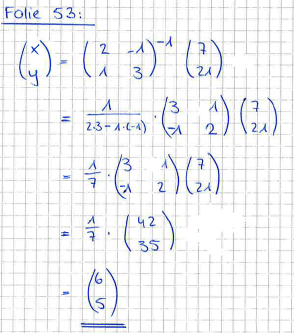
### Inverse einer 2x2 Matrix



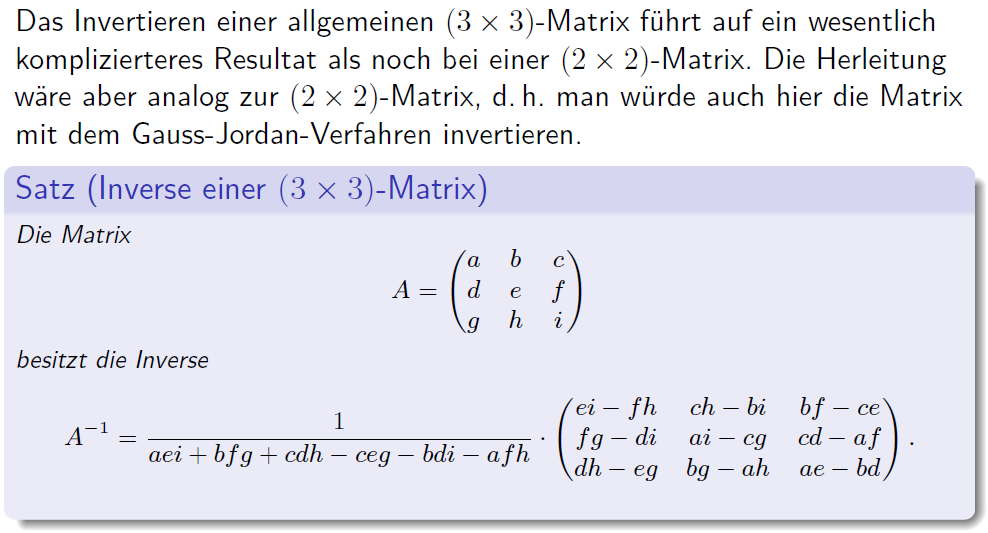
### Gleichungssysteme und Matrixinvertierung







### Inverse einer 3x3 Matrix



# Woche 5