Berechnung der inversen Matrix im Spezialfall einer 2x2-Matrix (!)
Ausnützen früherer Überlegungen (vgl. Proseminar)

```
> restart;
  with(LinearAlgebra) :
> A := <<a11, a21>|<a12, a22>>;
  MatrixInverse(A);
```

$$A := \begin{bmatrix} a11 & a12 \\ a21 & a22 \end{bmatrix}$$

$$\begin{bmatrix} \frac{a22}{a11\,a22 - a12\,a21} & -\frac{a12}{a11\,a22 - a12\,a21} \\ -\frac{a21}{a11\,a22 - a12\,a21} & \frac{a11}{a11\,a22 - a12\,a21} \end{bmatrix} \quad \textbf{(1)}$$

```
> b := <1, 0>;
  LinearSolve(A, b);
  b := <0, 1>;
  LinearSolve(A, b);
```

$$b := \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} \frac{a22}{a11\,a22 - a12\,a21} \\ -\frac{a21}{a11\,a22 - a12\,a21} \end{bmatrix}$$

$$b := \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

$$\begin{bmatrix} -\frac{a12}{a11\,a22 - a12\,a21} \\ \frac{a11}{a11\,a22 - a12\,a21} \end{bmatrix} \quad \textbf{(2)}$$

```
> detA := a11 · a22 - a12 · a21;
  Aux1 := a22 · b1 - a12 · b2;
  Aux2 := a11 · b2 - a21 · b1;
  AInv11 := subs({b1 = 1, b2 = 0}, Aux1/detA);
  AInv21 := subs({b1 = 1, b2 = 0}, Aux2/detA);
  AInv12 := subs({b1 = 0, b2 = 1}, Aux1/detA);
```

$$AInv22 := subs\left(\{b1 = 0, b2 = 1\}, \frac{Aux2}{detA} \right);$$

$$detA := a11\ a22 - a12\ a21$$

$$Aux1 := -a12\ b2 + a22\ b1$$

$$Aux2 := a11\ b2 - a21\ b1$$

$$AInv11 := \frac{a22}{a11\ a22 - a12\ a21}$$

$$AInv21 := -\frac{a21}{a11\ a22 - a12\ a21}$$

$$AInv12 := -\frac{a12}{a11\ a22 - a12\ a21}$$

$$AInv22 := \frac{a11}{a11\ a22 - a12\ a21} \quad \textbf{(3)}$$

> $A := \langle \langle 1, 3 \rangle | \langle 2, 4 \rangle \rangle;$
> $MatrixInverse(A);$

$$A := \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

$$\begin{bmatrix} -2 & 1 \\ \frac{3}{2} & -\frac{1}{2} \end{bmatrix} \quad \textbf{(4)}$$

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