

## ADDITIONAL HOMEWORK PROBLEMS

MATH 22

(1) Define  $T : M_{2 \times 2} \rightarrow P_2$  by

$$T \begin{pmatrix} a & b \\ c & d \end{pmatrix} = (a + b) + 2dt + bt^2$$

Let  $\beta = \left\{ \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix} \right\}$  and  $\mathcal{C} = \{1, t, t^2\}$ .

Compute  $[T]_{\beta}^{\mathcal{C}}$ .

(2) (a) Similar as we did in class for the derivative, compute the matrix corresponding to the integral linear transformation  $T : P_2 \rightarrow P_3$ .

That is  $T(p(t)) = \int_0^t p(x) dx$ .

(b) Using the matrix that you computed in (a) find the integral of  $p(t) = 2 + t - 3t^2$ .