$$\overset{\mathbb{V}}{} \qquad \overset{\mathbb{W}}{}$$

1) f) $T: \mathbb{P}_2(\mathbb{R}) \Rightarrow \mathbb{R}$ tal que $T(a_0 + a_1x + a_2x^2) =$

$= \int_0^1 (a_0 + a_1x + a_2x^2)dx$, $\quad v = (1, 2, 0)$, $w = 1$

...

$$T(a_0 + a_1x + a_2x^2) = \int_0^1 (a_0 + a_1x + a_2x^2)\,dx = a_0\int_0^1 dx + a_1\int_0^1 x\,dx + a_2\int_0^1 x^2 dx$$

$$= a_0 + \frac{1}{2}a_1 + \frac{1}{3}a_2$$

...

i) $T(1) = 1 + \frac{1}{2}\cdot 0 + \frac{1}{3}\cdot 0 = 1$

$T(x) = 0 + \frac{1}{2} + 0 = 1/2$ $\quad \Rightarrow A = \begin{bmatrix} 1 & 1/2 & 1/3 \end{bmatrix}$

$T(x^2) = 0 + 0 + \frac{1}{3} = 1/3$

...

ii) $Im(T) = \{w \in \mathbb{W}$ tal que $w = T(v)$ para algum $v \in \mathbb{V}\}$

$= \{w \in \mathbb{R}$ tal que $w = T(v)$ para algum $v \in \mathbb{P}_2(\mathbb{R})\}$

Utilizando a base canônica de $\mathbb{R}$ $(= \{1\})$, vamos determinar $Im(T)$, sabendo que $\dim(Im(T)) = posto(T) = 1$:

$T(v) = 1 \Rightarrow v =$

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