$$[z_0, z_1, z_2] \longmapsto [z_0^2, z_0 z_1, z_0 z_2, z_1^2, z_1 z_2, z_2^2]$$

$\Rightarrow$ A hyperplane section of $i_2(\mathbb{P}^2)$ is given as follows:

$$a_0 z_0^2 + a_1 z_0 z_1 + a_2 z_0 z_2 + a_3 z_1^2 + a_4 z_1 z_2 + a_5 z_2^2 = 0$$

for some $a_0, a_1, a_2, a_3, a_4, a_5$.

$\Rightarrow$ Clearly it is a curve of deg 2 in $\mathbb{P}^2$, since i_2 is a smooth embedding and $\{[z_0, z_1, z_2] ; a_0 z_0^2 + \cdots + \cdots + a_5 z_2^2 = 0\}$ is a curve of degree 2. In general, we can see from the example above that the hyperplane sections of $i_n(\mathbb{P}^2)$ are just the curves of degree n.

If we prove that $\{i_n(P_\nu)\}$ lie on a $\mathbb{P}^{N-2}$ in $\mathbb{P}^N$, consider $\{H \cap i_n(\mathbb{P}^2) \mid H$ is a hyperplane containing the $\mathbb{P}^{N-2}$ in $\mathbb{P}^N\}$, which is a set of curves of degree n.

$\Rightarrow$ We have only to prove that $\dim \{H \cap i_n(\mathbb{P}^2)\}$ is equal to 1+1, since dim of linear system is one less than the dim of sections.

$$\sigma_{a,b}([z_0, \cdots z_N]) = \{[z_0 \cdots z_N] \mid a Z_{N-1} + b Z_N = 0\}$$

$\sigma_{a,b} = a\sigma_1 + b\sigma_2$, where $\sigma_1 = \{[z_0, \cdots z_N] \mid Z_{N-1} = 0\}$

$\sigma_2 = \{Z_N = 0\}$, when we assumed the $\mathbb{P}^{N-2} = \{Z_{N-1} = Z_N = 0\}$.

$d_\sigma\{[a, b]\} = 1 \Rightarrow$ Pencil see P137.

Suppose we select N of the points P_ν, say $P_1, \cdots P_{\frac{n(n+3)}{2}}$ for simplicity of notation, and let $A \subset \mathbb{P}^N$ be any hyperplane containing N-1 of them, say $P_2, \cdots P_{n(n+3)/2}$.

Since

$$n^2 = \frac{n(n+3)}{2} + \frac{n(n-3)}{2}$$

and $\dim H^0(\mathbb{P}^2, \mathcal{O}((n-3)H)) = n(n-3)/2 + 1$, we may find a curve B of degree n-3 passing through $P_{(\frac{n(n+3)}{2})+1}$,