THE MATRIX OF H

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Let $H : E_X(\varphi) \times \Omega_X(\varphi) \to R$ be the bilinear pairing. By Exercise 37, if

$$
\begin{aligned}
A_1 &= (A_{10}, ..., A_{15}) \\
A_2 &= (A_{20}, ..., A_{25}) \\
A_3 &= (A_{30}, ..., A_{35}) \\
A_4 &= (A_{40}, ..., A_{45}) \\
A_5 &= (A_{50}, ..., A_{55})
\end{aligned}
$$

is a basis of $\Omega_X(\varphi)$, then $(A_{10}^4, ..., A_{15}^4), (A_{20}^4, ..., A_{25}^4), ..., (A_{50}^4, ..., A_{55}^4)$ is a basis for $E_X(\varphi)$. The matrix of H is then given by

$$
\begin{bmatrix}
\sum_{0\le i\le 5} A_{1i}^5 & \sum_{0\le i\le 5} A_{1i}^4 A_{2i} & \sum_{0\le i\le 5} A_{1i}^4 A_{3i} & \sum_{0\le i\le 5} A_{1i}^4 A_{4i} & \sum_{0\le i\le 5} A_{1i}^4 A_{5i} \\
\sum_{0\le i\le 5} A_{2i}^4 A_{1i} & \sum_{0\le i\le 5} A_{2i}^5 & \sum_{0\le i\le 5} A_{2i}^4 A_{3i} & \sum_{0\le i\le 5} A_{2i}^4 A_{4i} & \sum_{0\le i\le 5} A_{2i}^4 A_{5i} \\
\sum_{0\le i\le 5} A_{3i}^4 A_{1i} & \sum_{0\le i\le 5} A_{3i}^4 A_{2i} & \sum_{0\le i\le 5} A_{3i}^5 & \sum_{0\le i\le 5} A_{3i}^4 A_{4i} & \sum_{0\le i\le 5} A_{3i}^4 A_{5i} \\
\sum_{0\le i\le 5} A_{4i}^4 A_{1i} & \sum_{0\le i\le 5} A_{4i}^4 A_{2i} & \sum_{0\le i\le 5} A_{4i}^4 A_{3i} & \sum_{0\le i\le 5} A_{4i}^5 & \sum_{0\le i\le 5} A_{4i}^4 A_{5i} \\
\sum_{0\le i\le 5} A_{5i}^4 A_{1i} & \sum_{0\le i\le 5} A_{5i}^4 A_{2i} & \sum_{0\le i\le 5} A_{5i}^4 A_{3i} & \sum_{0\le i\le 5} A_{5i}^4 A_{4i} & \sum_{0\le i\le 5} A_{5i}^5
\end{bmatrix}
$$