non-degenerate bilinear form

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A bilinear form B over a vector space V is said to be *non-degenerate* when

- if $B(\mathbf{x}, \mathbf{y}) = 0$ for all $\mathbf{x} \in V$, then $\mathbf{y} = \mathbf{0}$, and

- if $B(\mathbf{x}, \mathbf{y}) = 0$ for all $\mathbf{y} \in V$, then $\mathbf{x} = \mathbf{0}$.