Trace and Determinent

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1 Trace

Definition 1.1: **Let V be f.d.v.s. Then Trace is a linear map: $\mathcal{L}(V) \to$ F.i.e.,** $\mathrm{tr} \in \mathcal{L}(\mathcal{L}(V), \mathbf{F})$ **such that**

1. $T \in \mathcal{L}(V)$**, eigenvalues** $\lambda_1 ..., \lambda_m$ **multiplicities** $d_1, ..., d_m$ **(over** $\mathcal{C}$**)** $\mathrm{Tr}(T) = d_1\lambda_1 + \cdots + d_m\lambda_m$
2. $\mathrm{Tr}(S + T) = \mathrm{Tr}(S) + \mathrm{Tr}(T)$
3. **Let** B **be a basis for** V