Let $L(H)$ denote the algebra of bounded operators on a separable Hilbert space H. By an *asymptotic representation* of a C^*-algebra A on H we mean an asymptotic homomorphism $\mu = (\mu_t)_{t\in[0,\infty)} : A \to L(H)$. By using asymptotic representations instead of genuine ones we introduce two new tensor norms on the algebraic tensor product $A \odot D$ of two C^*-algebras A and D, which respect asymptotic homomorphisms.

Let H_1, H_2 be separable Hilbert spaces and let $\mu = (\mu_t)_{t\in[0,\infty)} : A \to L(H_1), \nu = (\nu_t)_{t\in[0,\infty)} : D \to L(H_2)$ be two equicontinuous asymptotic representations. For a finite sum $c = \sum_i a_i \odot d_i \in A \odot D$, $a_i \in A$, $d_i \in D$, put $\|c\|_{\mu,\nu} = \limsup_{t\to\infty} \|\sum_i \mu_t(a_i) \otimes \nu_t(d_i)\|$. Define the *asymptotic tensor norm* by $\|c\|_\sigma = \sup_{\mu,\nu} \|c\|_{\mu,\nu}$, where we take the supremum over all pairs (μ, ν) of asymptotic representations of A and D respectively. We define also the *left asymptotic tensor norm* $\|\cdot\|_\lambda$ on $A \odot D$ by taking the supremum over all pairs (μ, ν), where μ is an asyptotic representation of A and ν is a genuine representation of D.

Denote by $A \otimes_\lambda D$ and $A \otimes_\sigma D$ the C^*-algebras obtained by completing $A \odot D$ with respect to the norm $\|\cdot\|_\lambda$ and $\|\cdot\|_\sigma$ respectively.

If $\phi = (\phi_t)_{t\in[0,\infty)} : A_1 \to A_2$ and $\psi = (\psi_t)_{t\in[0,\infty)} : D_1 \to D_2$ are asymptotic homomorphisms then their tensor product $\phi_t \otimes \psi_t$ extends to an asymptotic homomorphism from $A_1 \otimes_\sigma D_1$ to $A_2 \otimes_\sigma D_2$.

Theorem. The tensor norm $\|\cdot\|_\lambda$ differs both from the minimal and the maximal tensor norms. The tensor norm $\|\cdot\|_\sigma$ differs from the minimal tensor norm.