Integrability - Some additional info, 12 December 2012

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Fall 2012
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Consider a QFT with only one particle type. We know that a basis of asymptotic states can be written as

$$|\theta_1, \dots, \theta_n\rangle, \quad \theta_1 > \dots > \theta_n$$

where θ_j are rapidities. The resolution of the identity in terms of this basis is

$$\mathbf{1} = \sum_{n=0}^{\infty} \int_{\theta_1 > \dots > \theta_n} d\theta_1 \cdots d\theta_n \; |\theta_1, \dots, \theta_n\rangle\langle\theta_1, \dots, \theta_n|$$

Further, the Hamiltonian and momentum operator eigenvalues on the asymptotic states are

$$H|\theta_1, \dots, \theta_n\rangle = \sum_{j=1}^{n} m \cosh\theta_j \; |\theta_1, \dots, \theta_n\rangle, \quad P|\theta_1, \dots, \theta_n\rangle = \sum_{j=1}^{n} m \sinh\theta_j \; |\theta_1, \dots, \theta_n\rangle.$$