

Efremov's Factorization

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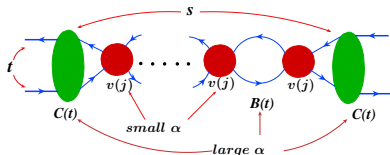
Regge Ladder

- ▶ Regge kinematics $s \gg |t| \sim m^2$

$$A(s, t) \sim \int_{-\delta-i\infty}^{-\delta+i\infty} \Gamma(-j) s^j \underbrace{\prod_{\sigma} \frac{d\alpha_{\sigma}}{D^2(\alpha)} \left(\frac{A_s(\alpha)^j}{D(\alpha)} \right) e^{it \frac{A_t(\alpha)}{D(\alpha)} - im^2 \sum \alpha_{\sigma}}}_{\text{Mellin transform } \Phi(j, t)}$$

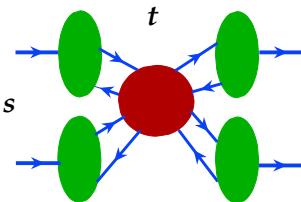
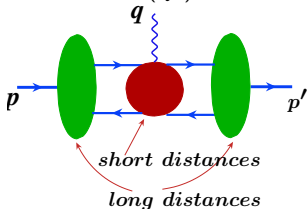
- ▶ j -Poles of $\Phi(j, t)$ come from small α_{σ} for lines of s -subgraphs: dependence on s disappears if a s -subgraph is contracted into point
- ▶ Factorization of A_s, A_t, D in α -representation \Rightarrow

$$\begin{aligned} \Phi(j, t) &= C(t) \{ v(j) + v(j)B(t)v(j) + v(j)B(t)v(j)B(t)v(j) + \dots \} C(t) \\ &= C(t) \frac{1}{v^{-1}(j) - B(t)} C(t) \sim \frac{\beta(t)}{j - \alpha(t)} \end{aligned}$$



Exclusive Processes

- ▶ Long-distance part in DIS gives parton distribution functions
- ▶ Long-distance parts in hard exclusive processes correspond to distribution amplitudes
- ▶ Form factors $F(Q^2)$ and $2 \rightarrow 2$ scattering amplitudes $T(s, t)$



- ▶ A.V. Efremov, "High-Energy Processes in Scale Invariant Quark Model", JINR-E2-7864, Apr 1974. 19pp. Submitted to 17th Int. Conf. on High-Energy Physics, London, England, Jul 1-10, 1974
- ▶ The concept of FACTORIZATION was developed by A.V. Efremov well before other groups (which started to use the term in 1978)