Endpoints are not always linearly independent

e.g. if $m_{\tilde{q}_L} > m^2_{\tilde{\chi}^0_2}/m_{\tilde{\chi}^0_1}$ and $m^2_{\tilde{\chi}^0_1} + m^2_{\tilde{\chi}^0_2} > 2m_{\tilde{\chi}^0_1} m_{\tilde{\chi}^0_2} > 2m^2_{\tilde{q}_L}$

then the endpoints are

$$\left(m_{ll}^{\text{max}}\right)^2 = (m^2_{\tilde{\chi}^0_2} - m^2_{\tilde{l}_R})(m^2_{\tilde{l}_R} - m^2_{\tilde{\chi}^0_1})/m^2_{\tilde{l}_R}$$
$$\left(m_{qll}^{\text{max}}\right)^2 = (m^2_{\tilde{q}_L} - m^2_{\tilde{l}_R})(m^2_{\tilde{l}_R} - m^2_{\tilde{\chi}^0_1})/m^2_{\tilde{l}_R}$$
$$\left(m_{ql_n}^{\text{max}}\right)^2 = (m^2_{\tilde{q}_L} - m^2_{\tilde{\chi}^0_2})(m^2_{\tilde{\chi}^0_2} - m^2_{\tilde{l}_R})/m^2_{\tilde{\chi}^0_2}$$
$$\left(m_{ql_f}^{\text{max}}\right)^2 = (m^2_{\tilde{q}_L} - m^2_{\tilde{\chi}^0_2})(m^2_{\tilde{l}_R} - m^2_{\tilde{\chi}^0_1})/m^2_{\tilde{l}_R}$$
$$\Rightarrow \quad \left(m_{qll}^{\text{max}}\right)^2 = \left(m_{ll}^{\text{max}}\right)^2 + \left(m_{ql_f}^{\text{max}}\right)^2$$

Four endpoints not always sufficient to find the masses

angle between leptons in slepton rest frame

- Introduce new distribution $m_{qll\ \theta>\pi/2}$ identical to m_{qll} except require $\theta>\pi/2$

  It is the minimum of this distribution which is interesting

Slide from David Miller