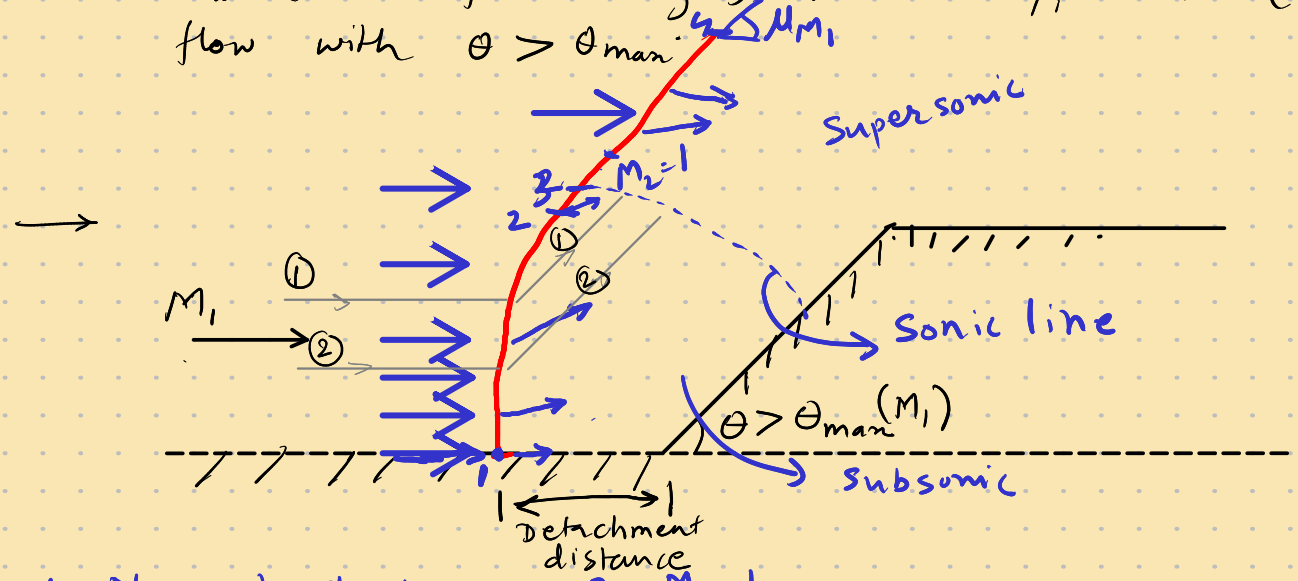
Bow Shocks :-

Q:- I know that for a given M_1, there exists a θ_{max} (flow deflection angle). What to happens to a flow with $\theta > \theta_{max}$.



1. Normal shock
2. $\theta = \theta_{max}(M_1)$
3. $M_2 = 1$
4. Mach angle $\mu_{M_1} = \sin^{-1}\left(\frac{1}{M_1}\right)$

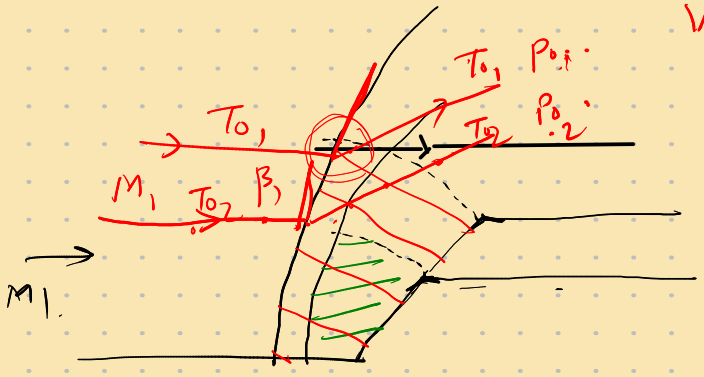
1–3 :- Strong oblique shocks

3–4 :- Weak " "

Q:- What can I say about the flow after the bow shock?

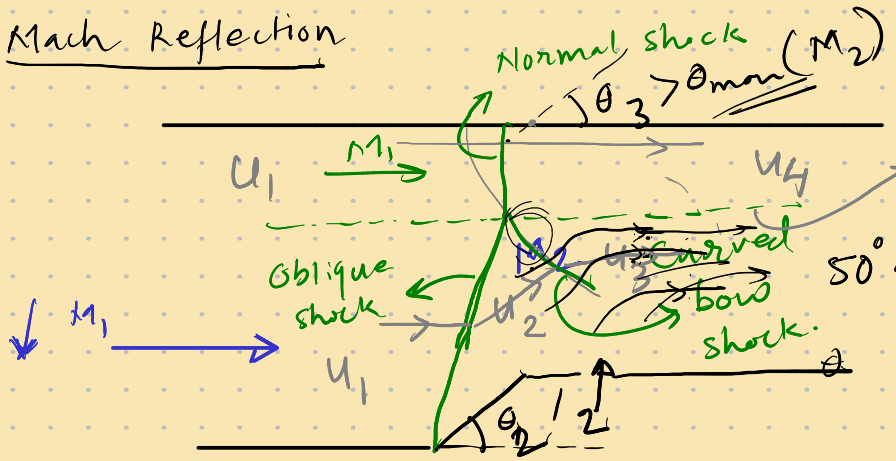
Q. Can I predict $p, T, \rho, u, \Delta S/R$ etc?

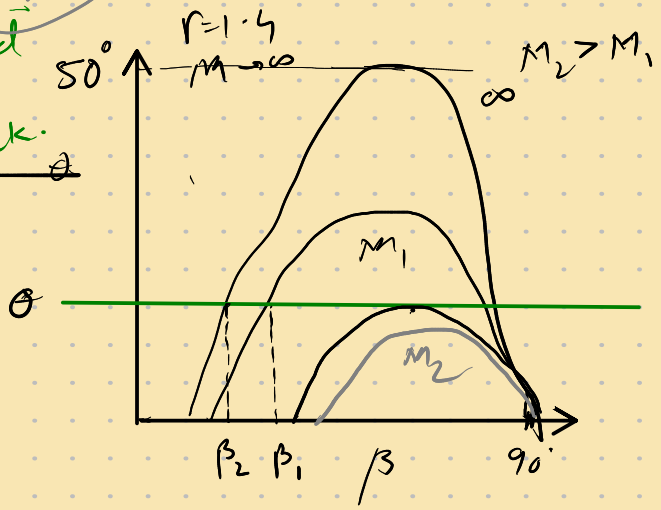
→



Vorticity $\vec{\mu}(\vec{\nabla} \times \vec{v})$

Mach Reflection





$|u_3| \neq |u_4|$

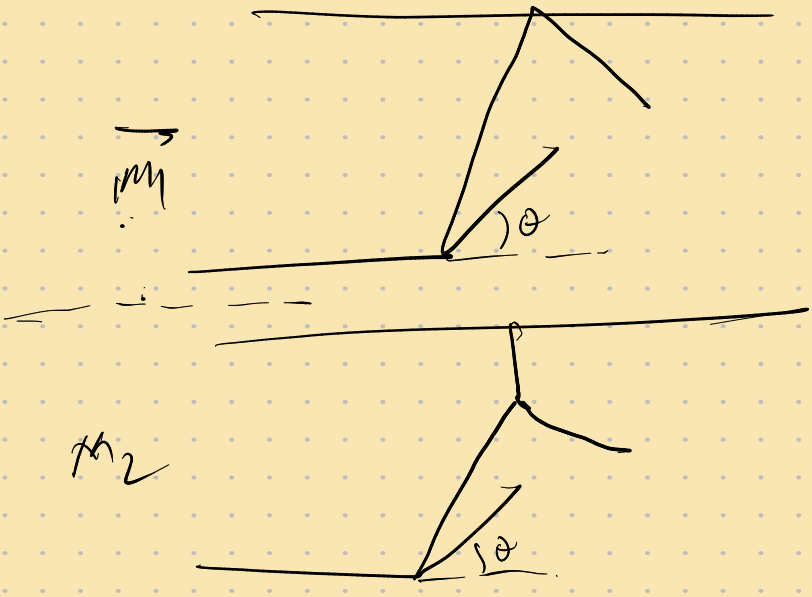
$\vec{u_3} \parallel \vec{u_4}$

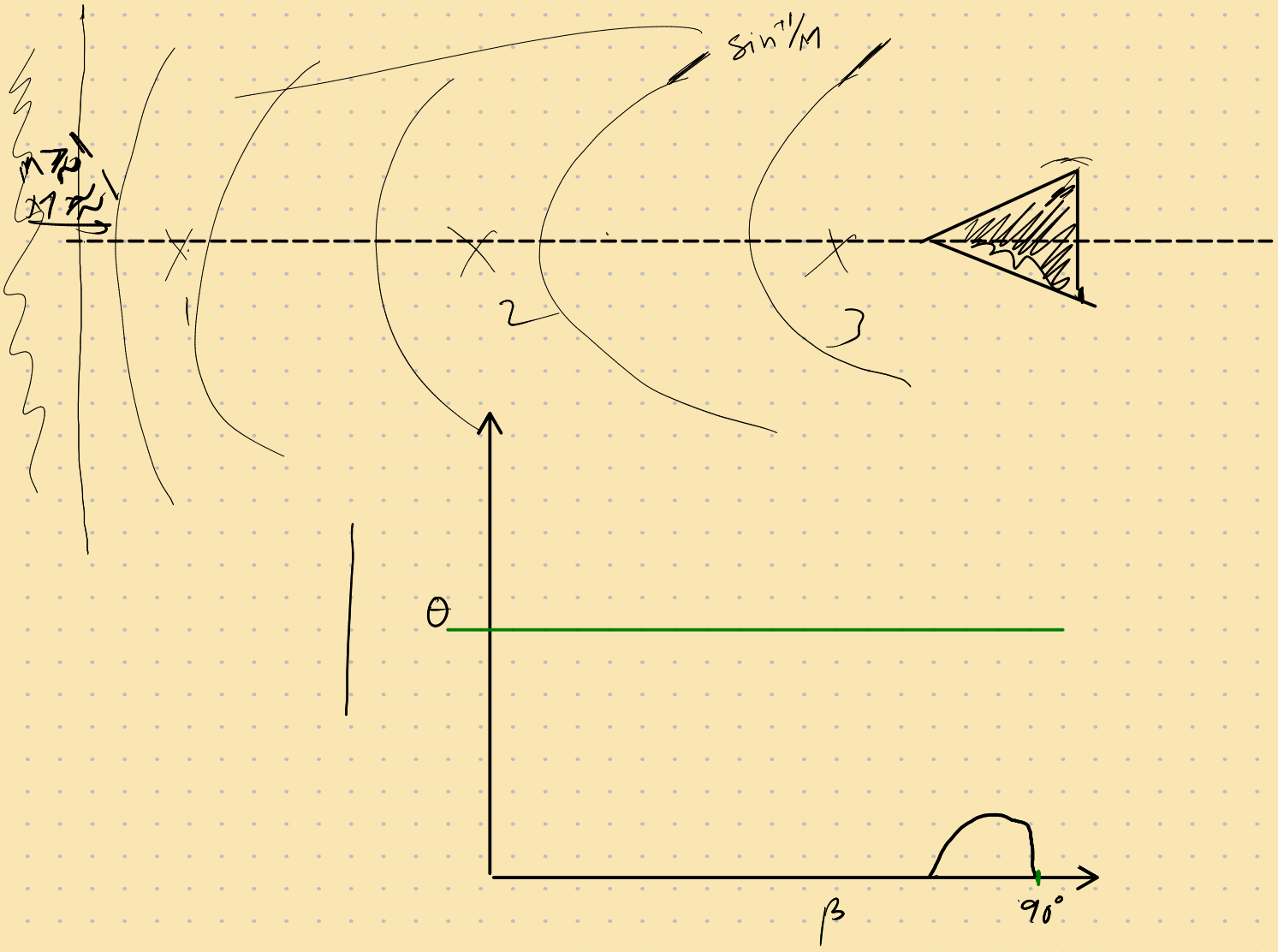
$p_3 = p_4$

$M_2 < M_1$

$\theta_2 = \theta_3$

$\beta_3 > \beta_2$




sin⁻¹/M
1
2
3

θ
β
90°