Conclusions

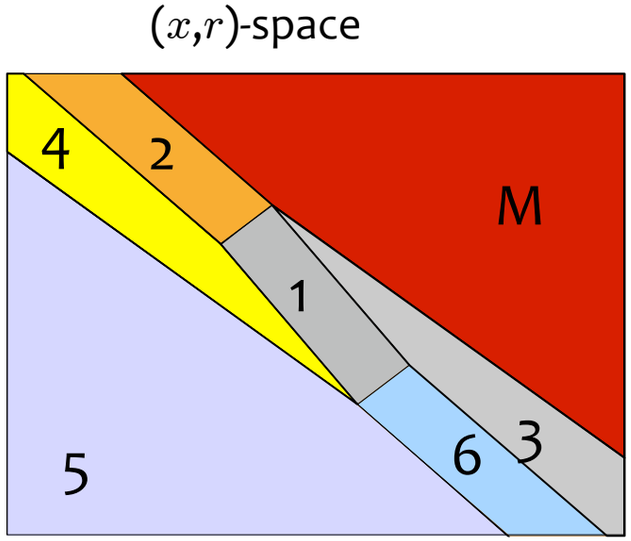
Conclusions

- **Hybrid systems** are a modeling framework for automotive control problems where continuous switched dynamics and logic are relevant (and linear models are not enough!)

- **MPC control design** handle all performance specs and constraints in a natural and direct way. Quite complex systems can be controlled using on-line optimization

- **Piecewise affine MPC controllers** can be synthesized, off-line, and implemented as look-up tables of linear gains

$$u(x,r) = \begin{cases} F_1 x + E_1 r + g_1 & \text{if} \quad H_1 \left[\begin{smallmatrix} x \\ r \end{smallmatrix}\right] \leq K_1 \\ \vdots & \vdots \\ F_M x + E_M r + g_M & \text{if} \quad H_M \left[\begin{smallmatrix} x \\ r \end{smallmatrix}\right] \leq K_M \end{cases}$$



- **Matlab tools** available to assist the whole design process (models, simulation, MPC design, code generation):

  ⇒ MPC Toolbox (linear), Hybrid Toolbox (hybrid, explicit)

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