AtiMac problem

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Liu の演習問題の解答をまとめておく.

1 Sometopics incommutative algebra

2 Generalproperties of schemes

2.1 Spectrum of a ring

2.2 Ringed topological spaces

Exercise 1. *Determine the sheaf associated to the presheaf A_X of Example 2.4. Such a sheaf is called a constant sheaf. Show that A_X is a sheaf if and only if every non-empty open subset of X is connected.*

Exercise 2. *Let $\mathcal{F}$ be a sheaf on X. Let $s, t \in \mathcal{F}(X)$. Show that the set of $x \in X$ such that $s_x = t_x$ is open in X.*

Proof. germ の定義から $s_x = t_x$ となる場合,ある開集合 U_x が存在し, $\rho_{U_x}(s) = \rho_{U_x}(t)$ となる.この時,任意の $y \in U_x$ に対し, $s_y = t_y$ となる.そのため,the set of $x \in X$ such that $s_x = t_x$ は $\cup_x U_x$ となり,開集合になる. $\qquad\square$