## Abstract

In the two lectures in the week March 25-29, 2019, I shall present the details of the construction from the research paper: Larfeldt and Lech: Analytic ramifications and at couples of local rings, *Acta Math.* **146** (1981), no. 3-4, 201-208.

**Theorem** Let  $\varphi : (A, \mathfrak{m}_A) \longrightarrow (B, \mathfrak{m}_B)$  be a flat homomorphism of local rings with dim  $A = \dim B$ . Then there exists a local ring  $(C, \mathfrak{m}_C)$  and flat local homomorphisms

$$f: (A, \mathfrak{m}_A) \longrightarrow (C, \mathfrak{m}_C)$$
 and  $g: (B, \mathfrak{m}_B) \longrightarrow (C, \mathfrak{m}_C)$  such that:

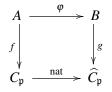
(i) the diagram



is commutative.

- (ii)  $\mathfrak{p} := \mathfrak{m}_A C$  is a prime ideal of C with dim  $C/\mathfrak{p} = 1$ .
- (iii)  $\mathfrak{p}^* := \mathfrak{m}_B \widehat{C}$  is a prime ideal of  $\widehat{C}$  with dim  $\widehat{C}/\mathfrak{p}^* = 1$ .
- (iv)  $\mathfrak{p}^* \cap C = \mathfrak{p}$ .
- (v) the map  $g: B \longrightarrow \widehat{C}$  has the form  $B \xrightarrow{\text{nat. inclusion}} \widehat{B}[[X]]$ , where X is an indeterminate.

It induces a transformation  $(A, B) \mapsto \{C, \mathfrak{p}\}$  such that the analytic ramification of  $\mathfrak{p}$  reflects the structure of (A, B) in as much as there exists a commutative diagram :



with unramified flat homomorphisms as vertical maps. This ingenious construction has an interesting applications.