

# Implementación de Métodos de Aprendizaje Automatizado en problemas colisionales

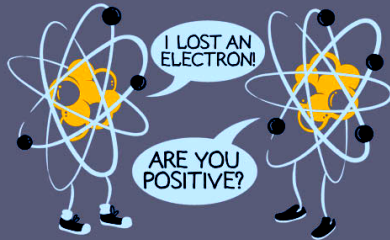
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# Método de Inversión Depurada (DIM)

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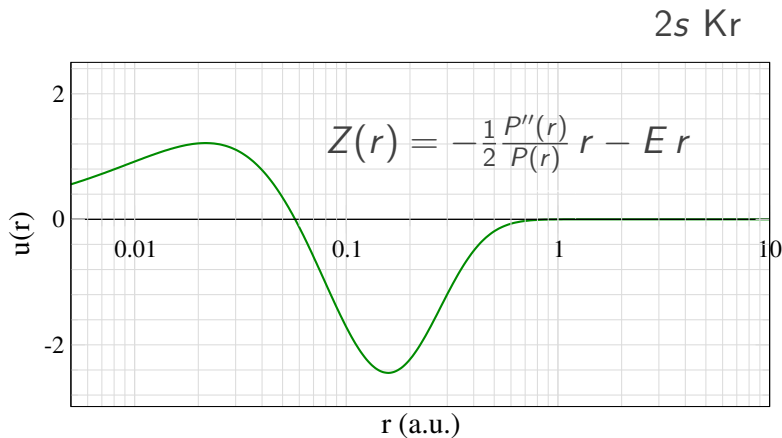
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$$Z_{nl}(r) = -\frac{1}{2} \frac{P_{nl}''(r)}{P_{nl}(r)} r + \frac{l(l+1)}{2r} - E_{nl} r$$

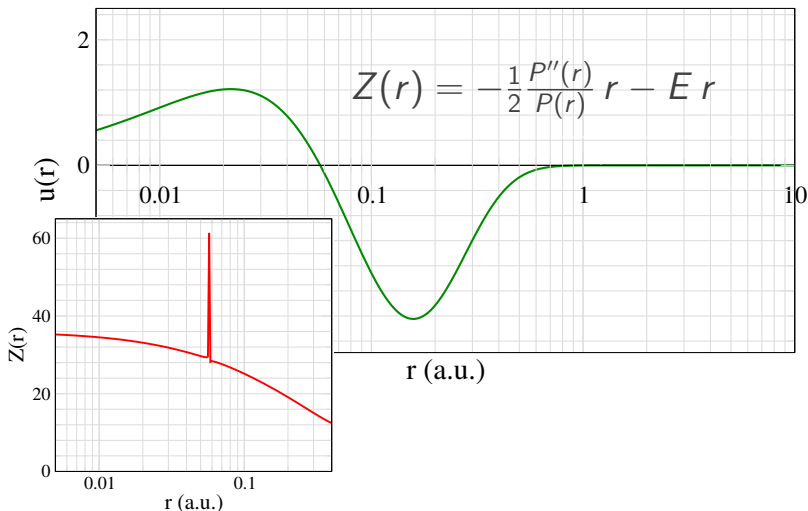
# Houston, we have a problem!





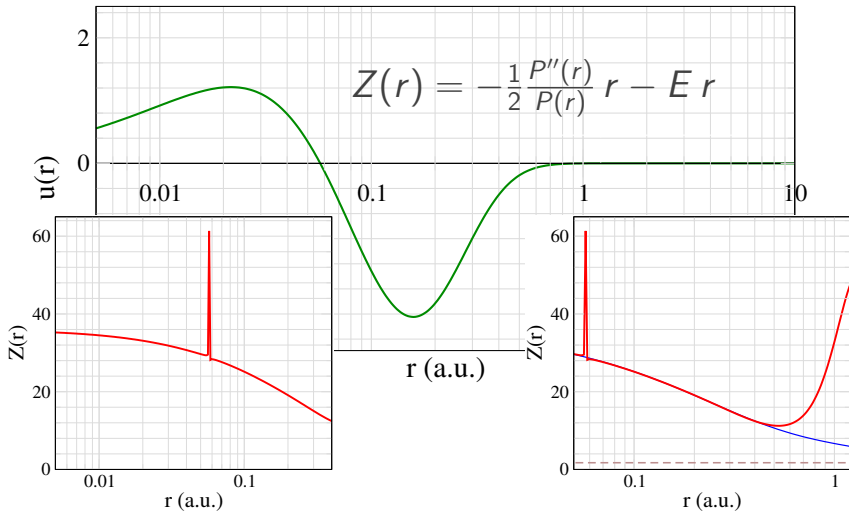
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2s Kr

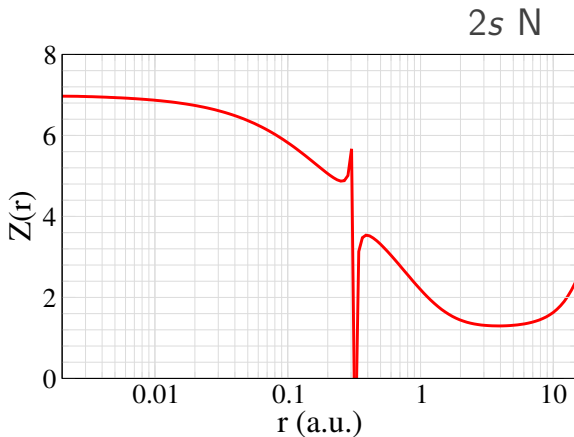


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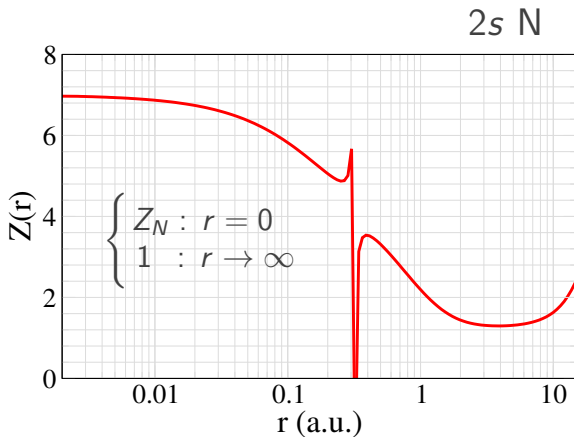
2s Kr



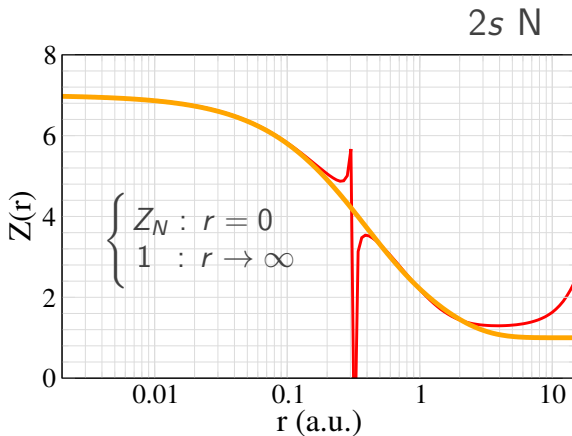
# Depuración



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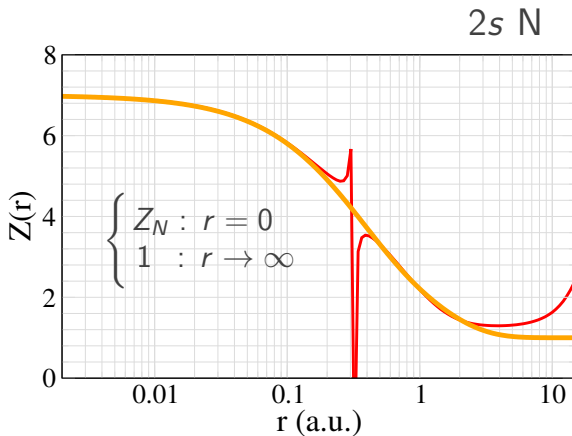


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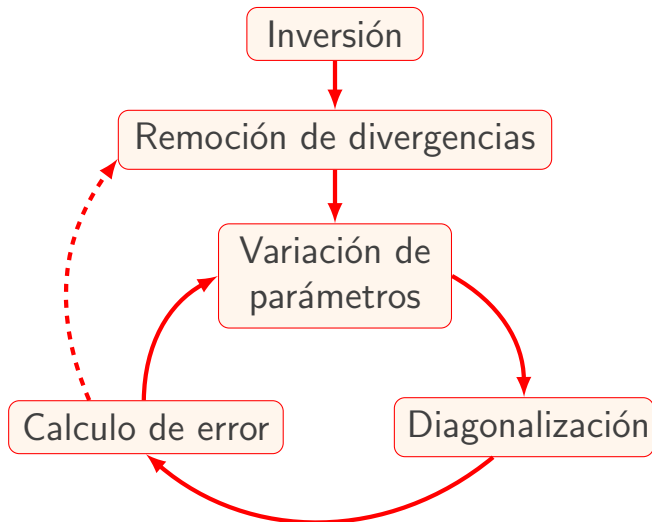
$$Z(r) = 1 + \sum_j \alpha_j e^{-\beta_j r}$$

# Depuración

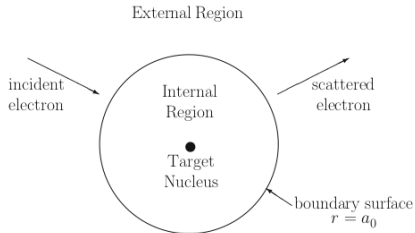


$$Z(r) = 1 + \sum_j \alpha_j e^{-\beta_j r}$$

# Procedimiento



# R-Matrix



## Estructura del blanco

AUTOSTRUCTURE



Región interna

RMATRXI



Región externa

STGF



# Descripción del blanco

$$\Phi_i(\mathbf{r}) = \sum_j c_{ji} \phi_j(\mathbf{r})$$

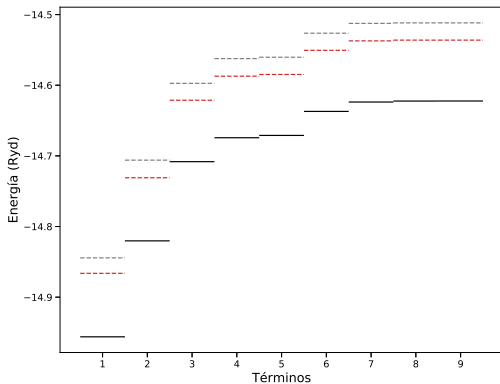
Configuration  
interaction

$$\left[ \frac{1}{2} \frac{d^2}{dr^2} - \frac{l(l+1)}{2r^2} + V_{nl}^{\text{eff}}(\lambda_{nl}, r) + E_{nl} \right] P_{nl}(r) = 0$$

- Thomas–Fermi–Dirac–Amaldi
- Slater-Type-Orbital de Burgess

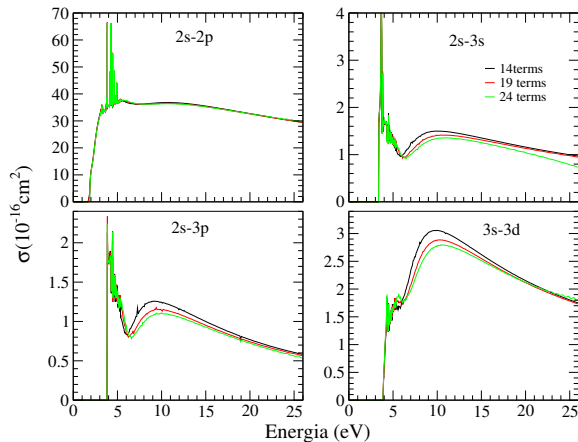
# Ejemplo: Litio

$\left\{ \begin{array}{l} 1s^2 2s \\ 1s^2 2p \\ 1s^2 3s \\ 1s^2 3p \\ 1s^2 3d \\ \dots \end{array} \right.$

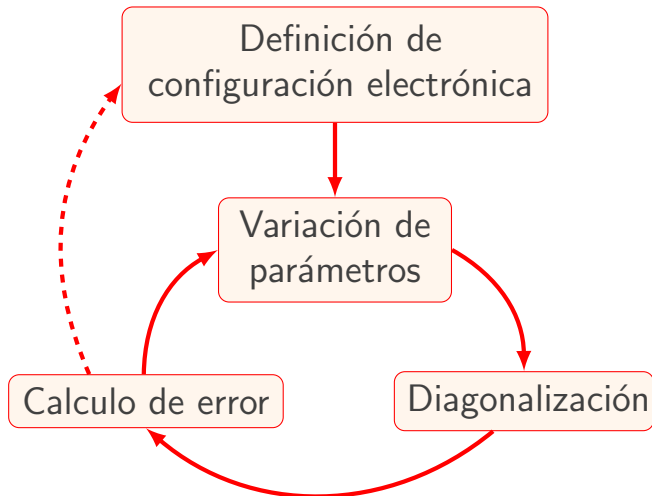


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# Procedimiento

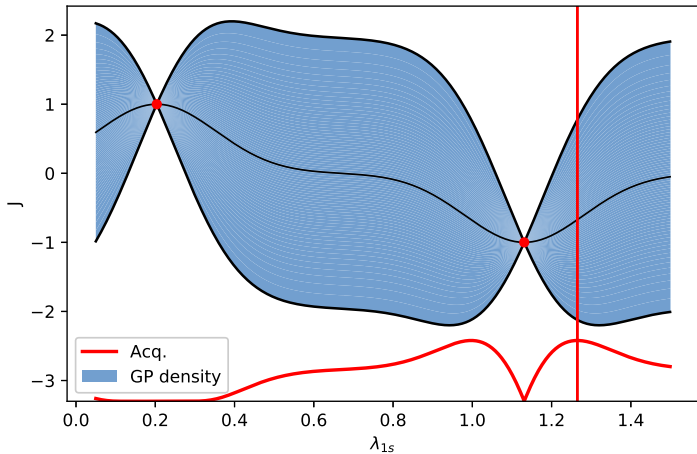


# Síntesis del problema

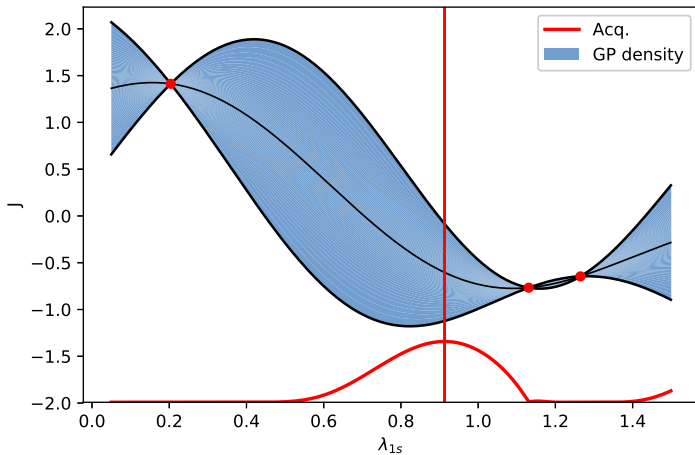
$$J = \sum_j \left| \frac{E_j^{\text{calc}}(\xi) - E_j^{\text{teo}}}{E_j^{\text{teo}}} \right|$$

- DIM:  $\xi = \{\alpha, \beta\}$
- R-Matrix:  $\xi = \{\text{Configuraciones}, \lambda\}$

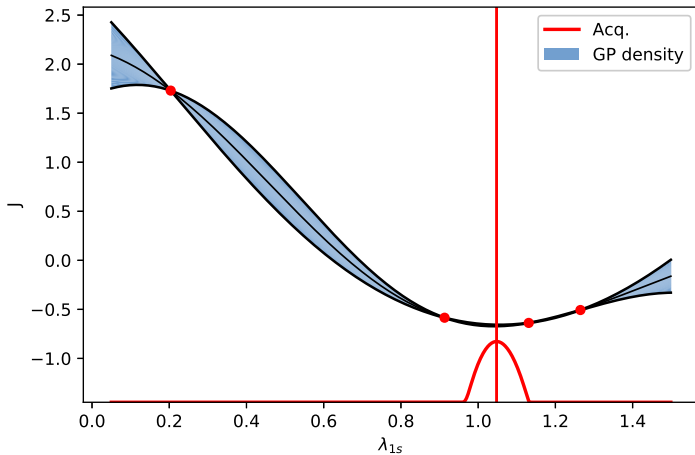
# Procesos Gaussianos



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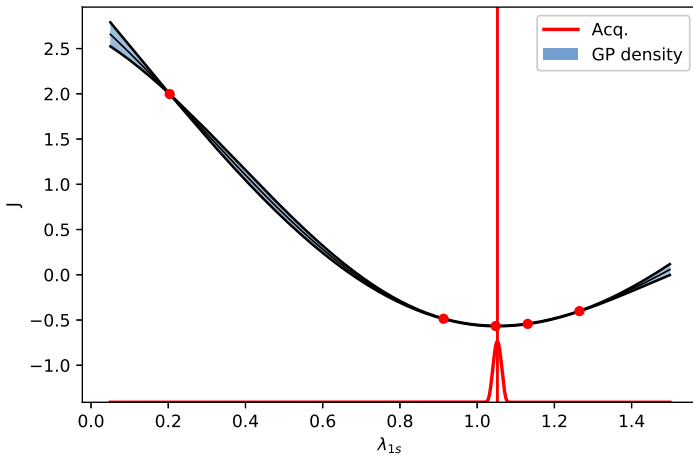


# Procesos Gaussianos





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# Resultados DIM

# Resultados R-Matrix

