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**Designing an optimization program of blending for unleaded  
gasoline formulation at the Skikda refinery**

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## Abstract:

The design and optimization of unleaded gasoline blending processes play a crucial role in meeting the growing demand for high-quality fuels and ensuring compliance with environmental regulations. This work focuses on developing an optimization program for blending unleaded gasoline at the Skikda Refinery, to achieve maximum product quality and operational efficiency.

To develop the optimization program, a comprehensive dataset is collected and prepared, encompassing the properties of different gasoline components, including density, octane number, vapor pressure, and blending constraints. The artificial neural network model is then trained and validated using this dataset, ensuring accurate predictions and reliable optimization results.

The knowledge gained from this work contributes to the advancement of utilizing artificial intelligence techniques in refining operations, particularly in the field of gasoline blending.

**Keywords:** unleaded gasoline, Skikda refinery, optimization program, artificial neural network, environmental regulations.

## ملخص:

يلعب تصميم وتحسين عملية خلط تركيبة البنزين بدون رصاص دورًا حاسمًا في تلبية الطلب المتزايد على الوقود عالي الجودة وضمن الامتثال للتشريعات البيئية. يركز هذا العمل على تطوير برنامج تحسين لخلط البنزين بدون رصاص في مصفاة سكيكدة، بهدف تحقيق أقصى قدر من جودة المنتج وكفاءة التشغيل.

لتطوير برنامج التحسين، يتم جمع وتجهيز مجموعة شاملة من البيانات، تشمل خصائص مكونات البنزين المختلفة، مثل الكثافة ورقم الأوكتان وضغط البخار وقيود الخلط. يتم بعد ذلك تدريب وتحقق نموذج الشبكة العصبية الاصطناعية باستخدام هذه المجموعة من البيانات، مما يضمن توقعات دقيقة ونتائج تحسين موثوقة.

تساهم المعرفة المكتسبة من هذا العمل في تقدم استخدام تقنيات الذكاء الاصطناعي في عمليات التكرير، وخاصة في مجال خلط البنزين.

**الكلمات المفتاحية:** بنزين بدون رصاص , مصفاة سكيكدة، برنامج التحسين، الشبكة العصبية الاصطناعية, التشريعات البيئية

**Résumé :**

La conception et l'optimisation du processus de mélange de l'essence sans plomb jouent un rôle crucial dans la satisfaction de la demande croissante en carburants de haute qualité et garantissent le respect des réglementations environnementales. Ce travail se concentre sur le développement d'un programme d'optimisation pour le mélange d'essence sans plomb à la raffinerie de Skikda, dans le but d'atteindre une qualité de produit maximale et une efficacité opérationnelle.

Pour développer le programme d'optimisation, un ensemble de données est collecté et préparé, comprenant les propriétés des différents composants d'essence tels que la densité, le nombre d'octane, la pression de vapeur et les contraintes de mélange. Le modèle de réseau neuronal artificiel est ensuite entraîné et validé à l'aide de cet ensemble de données, garantissant des prédictions précises et des résultats d'optimisation fiables.

Les connaissances acquises grâce à ce travail contribuent à l'avancement des techniques d'intelligence artificielle dans les opérations de raffinage, notamment dans le domaine du mélange d'essence.

**Mots-clés :** essence sans plomb, raffinerie de Skikda, programme d'optimisation, réseau neuronal artificiel, réglementations environnemental.

