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(54) **Air/fuel mixture ratio control system for internal combustion engine with feature of learning
correction coefficient including altitude dependent factor.**

(57) A method for controlling a mixture ratio of an air/fuel mixture for an engine, comprises the steps of: monitoring (1002) preselected basic first engine operation parameter to produce a first sensor signal indicative thereof; monitoring (1204) an air/fuel mixture ratio indicative parameter (V_{ox}) for producing a second sensor signal indicative of a deviation of the air/fuel mixture from a stoichiometric value; deriving (1002, 1006) a basic fuel metering amount (T_p) on the basis of said first sensor signal value; deriving (1008) an air/fuel ratio dependent correction factor (COEF) from said second sensor signal value; deriving (1610) a first correction coefficient (K_{ALT}) on the basis of said air/fuel ratio dependent correction factor (COEF), which first correction coefficient is commonly applicable for correcting said basic fuel metering amount (T_p) in all engine driving ranges, said step (1610) comprising the updating of the first correction coefficient (K_{ALT}) when a feedback condition is satisfied; deriving (1012) a second correction coefficient (K_{MAP}) which is variable depending upon the engine driving range on the basis of said air/fuel ratio dependent correction factor (COEF) and setting a plurality of second correction coefficients (K_{MAP})

for respective engine driving ranges and updating each of said second correction coefficients with an instantaneous value derived based on said air/fuel ratio dependent correction factor in the corresponding engine driving range; detecting (1002-1014) an engine driving condition on the basis of said first sensor values and governing said steps (1610, 1012) of deriving said first and second correction coefficients (K_{ALT} , K_{MAP}) depending upon the detected engine driving condition; and correcting (1018, 1020) said basic fuel metering amount (T_p) with said first and second correction coefficients (K_{ALT} , K_{MAP}).

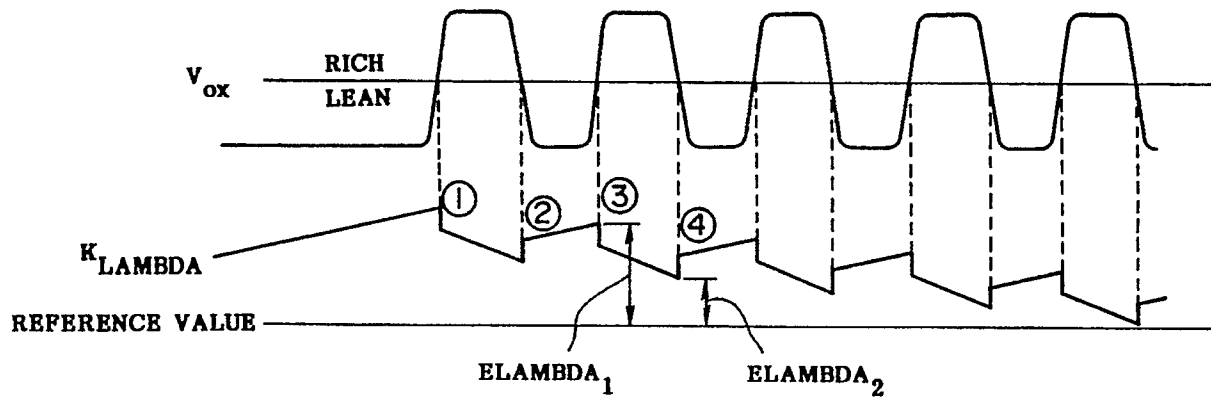
For achieving an enhanced accuracy in determining the fuel metering amount the step of deriving the first correction coefficient (K_{ALT}) further comprises the steps of determining (1724) a first component ratio indicative value (k_1) based on at least one of an engine load indicative signal (α , Q), a basic fuel injection amount (T_p) and the engine speed (N); determining a predetermined number of engine driving ranges for which the second correction coefficient (K_{MAP}) was recently updated; detecting (1726) for each range the difference between a present second correction coefficient (K_{MAP}) and a previous

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one for distinguishing between positive difference regions, where the difference between the present and the previous second correction coefficient (K_{MAP}) for this region is positive, and negative difference regions; determining (1726-1732) a second compo-

nent ratio indicative value (k_2) based on the number of positive and/or negative difference regions; and modifying (1732-1736) the first correction coefficient (K_{ALT}) based on said first and second component ratio indicative values (k_1, k_2).

FIG. 10





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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	PATENT ABSTRACTS OF JAPAN, vol. 8, no. 40 (M-278), 21st February 1984; & JP-A-58 195 044 (MITSUBISHI) 14-11-1983 ---	1-3,5	F 02 D 41/04 F 02 D 41/26 F 02 D 41/14 F 02 D 41/34
A	US-A-4 625 699 (KOBAYASHI et al.) * Whole document * ---	1-3,5	
A,P	PATENT ABSTRACTS OF JAPAN, vol. 11, no. 205 (M-603), 3rd July 1987; & JP-A-62 23 805 (HITACHI) 31-01-1987 (Cat. A) -----	4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F 02 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-09-1991	Examiner GAGLIARDI P.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	